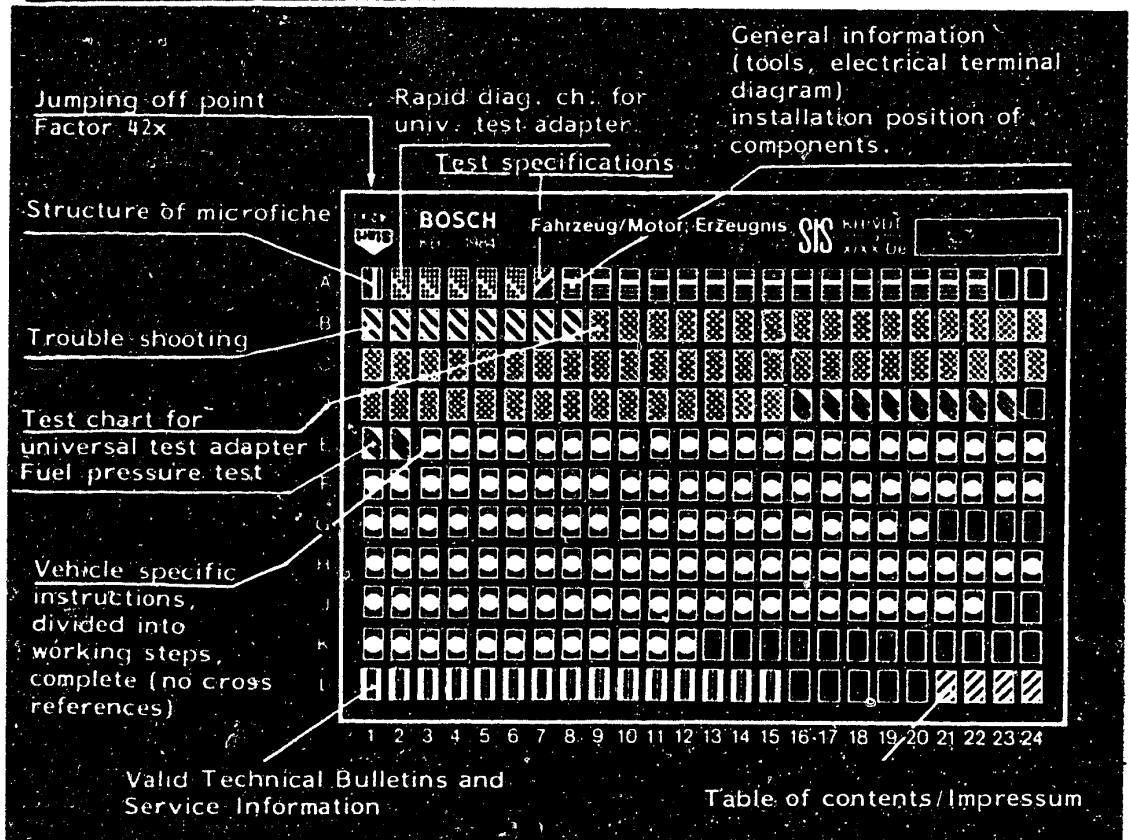


Structure of microfiche

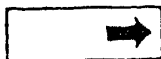


1. Read from left to right
2. Title of microfiche (appears on each coordinate)

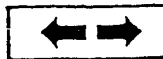
E16	Product/component/test step
	Vehicle/engine

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

C6

A1

Trouble-shooting program



Rapid diagnosis chart for universal test adapter

The following rapid diagnosis chart makes it possible for the experienced L-Jetronic expert to quickly check the electrical part of the system using the universal test adapter.

The rapid diagnosis chart contains the following information:

- Switch positions on the universal test adapter
- Sequence of test steps
- Notes on how to operate the universal test adapter or other components
- Readings on the multimeter
- References to coordinates of the relevant detailed testing and trouble-shooting program.

If detailed information and instructions are necessary, always proceed according to the trouble-shooting program starting on Coordinate B1/B2.



Rapid diagnosis chart for universal test adapter

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	Test specifications (reading)	See Coordinate for trouble-shooting
	V	Ω			
1	3	-	Shift gear to neutral. Operate starting motor. Measure voltage.	<u>8 ... 15 V</u>	B 11
2	4	-	Shift gear to neutral. Operate starting motor. Measure voltage.	<u>8 ... 15 V</u>	B 15
3	5	-	Shift gear to neutral. Operate starting motor. Measure voltage pulses with motortester.	Ignition pulses	B 19
4	6	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	B 21
5	7	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	B 23
6	8	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 3
7	9	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 7
8	10	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 11
9	11	-	Ignition "ON". Measure voltage. Deflect air-flow sensor flap	<u>8 ... 15 V</u>	C 15
10	12	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 19
11	13	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 21
12	14	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	D 1

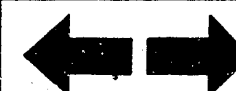
A3

Rapid diag. chart for univ. test adapter
Lancia Gamma i.e.












A4

Rapid diag. chart for univ. test adapter
Lancia Gamma i.e.



Rapid diagnosis chart for universal test adapter

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	<u>Test specifications (reading)</u>	<u>See Coordinate for trouble-shooting</u>
	V	Ω			
11		6	Measure resistance. Deflect air-flow sensor flap. 1) As of FD 049	$\frac{40 \dots 300 \Omega}{80 \dots 600 \Omega}^{1)}$	C 21
12		7	Measure resistance. 1) As of FD 049	$\frac{130 \dots 260 \Omega}{260 \dots 520 \Omega}^{1)}$	C 23
13		8	Measure resistance. 1) As of FD 049	$\frac{200 \dots 400 \Omega}{400 \dots 800 \Omega}^{1)}$	D 1
14		9	Measure resistance. Accelerator in rest position.	$\frac{0 \dots 10 \Omega}{}$	D 3
15		10	Accelerator in full-load position. Measure resistance.	$\frac{0 \dots 10 \Omega}{}$	D 5
16		11	Measure resistance.	$\frac{30 \Omega \dots 30 \text{ k}\Omega}{\text{(Depends on temperature)}}$	D 7
17		12	Measure resistance.	$\frac{30 \Omega \dots 30 \text{ k}\Omega}{\text{(Depends on temperature)}}$	D 9
18		13	Measure resistance.	$\frac{0 \dots 10 \Omega}{}$	D 11
19		14	Measure resistance.	$\frac{0 \dots 10 \Omega}{}$	D 13

A5

Rapid diag. chart for univ. test adapter
Lancia Gamma i.e.



A6

Rapid diag. chart for univ. test adapter
Lancia Gamma i.e.



TEST SPECIFICATIONS

B5

- Air-flow sensor

Fully deflect sensor flap

Resistance between term.7 and term.8: 100...500 Ω
as of FD 049: 200...1000 Ω

- Relay set

Resistance measurement between term.86b (positive pole of ohmmeter) and term.85.

Relay set 0 332 514 121/127: 70...500 Ω

Relay set 0 332 514 105: 50...110 Ω

Auxiliary-air device

25...60 Ω

B7

- Idle speed

Manually-shifted and automatic transmission: 900...1000 min⁻¹

Exhaust-gas setting

- CO concentration with engine at op.

temp.: 1.5...2.5 % by vol.CO

- Fuel pressure:

2.3...2.7 bar

- Fuel pump delivery

min. 750 cm³/30 s

- Injection valve:

2 ... 3 Ω

- Temperature sensors

NTC I

NTC II

Ambient temperature

(+15°C...+30°C): 1.45...3.3k Ω 1.30...3.6 k Ω

Engine at op.temp.

(approx. +80°C): 280...360 Ω 250...390 Ω

- Thermo-time switch

Electrical internal resistance:

"G" and ground

"W" and ground

"G" and "W"

Ambient temperature

(below +30°C): 25...40 Ω

0 Ω

25...40 Ω

Engine at op.temp.

(above +40°C): 50...80 Ω

100...160 Ω

50...80 Ω

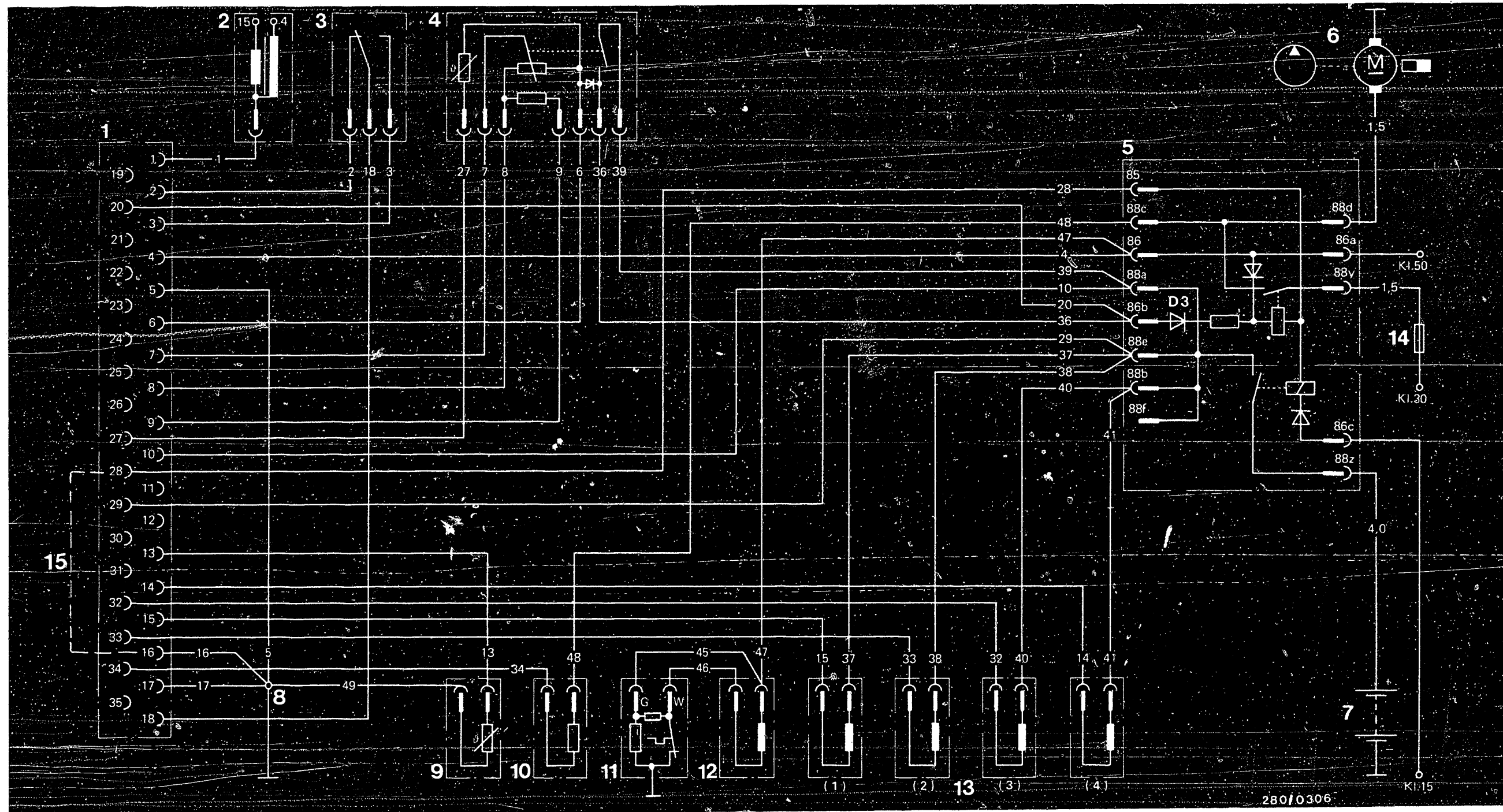
- See equipment and Autodata microfiches for settings for ignition, valve clearance and other engine data.

A7

Test specifications

Lancia Gamma i.e.





ELECTRICAL TERMINAL DIAGRAM OF L-JETRONIC

- | | | | | |
|---------------------------|------------------------|---------------------------|-----------------------------|---|
| 1 = Multiple plug | 5 = Relay set | 8 = Central ground | 12 = Start valve | * With relay set
...105 no term. 88f
or diode D3. |
| 2 = Ignition coil | (0 332 514 121)* | 9 = Temperature sensor II | 13 = Injection valves | |
| 3 = Throttle-valve switch | 6 = Electric fuel pump | 10 = Auxiliary-air device | 14 = Pump fuse | |
| 4 = Air-flow sensor | 7 = Battery | 11 = Thermo-time switch | 15 = Bridge in control unit | |
| | | | | |

A8

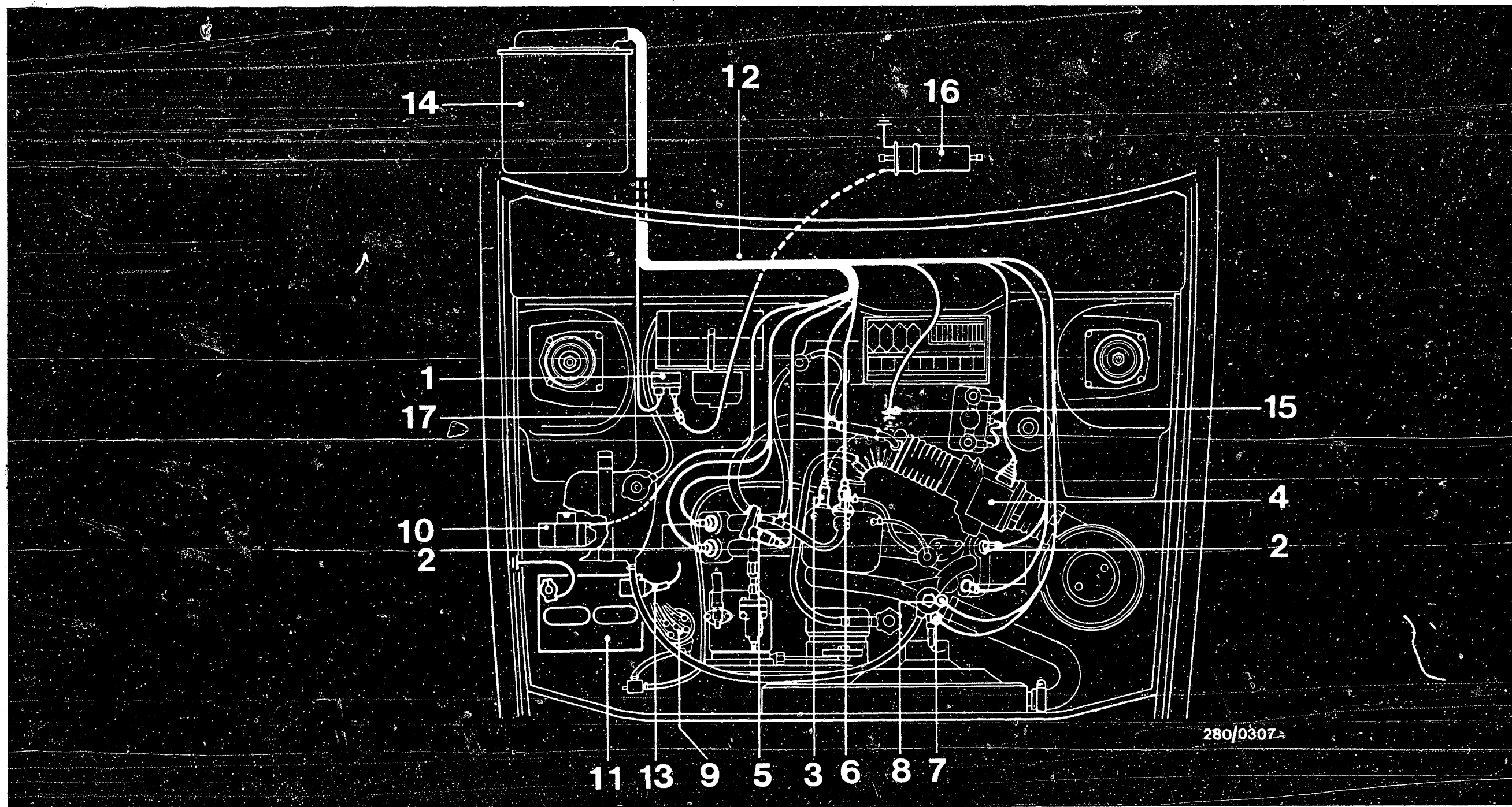
Electrical terminal diagram
Lancia Gamma i.e.



A9

Electrical terminal diagram
Lancia Gamma i.e.





ELECTRICAL WIRING DIAGRAM

1 = Relay set
2 = Injection valves
3 = Throttle-valve switch
4 = Air-flow sensor

5 = Auxiliary-air device
6 = Start valve
7 = Thermo-time switch
8 = Temperature sensor

9 = Ignition distributor
10 = Ignition coil
11 = Battery
12 = Jetronic wiring harness

13 = Vehicle wiring harness
14 = Control unit
15 = Central ground
16 = Electric fuel pump
17 = Pump fuse

A10

Electrical wiring diagram
Lancia Gamma i.e.



A11

Electrical wiring diagram
Lancia Gamma i.e.



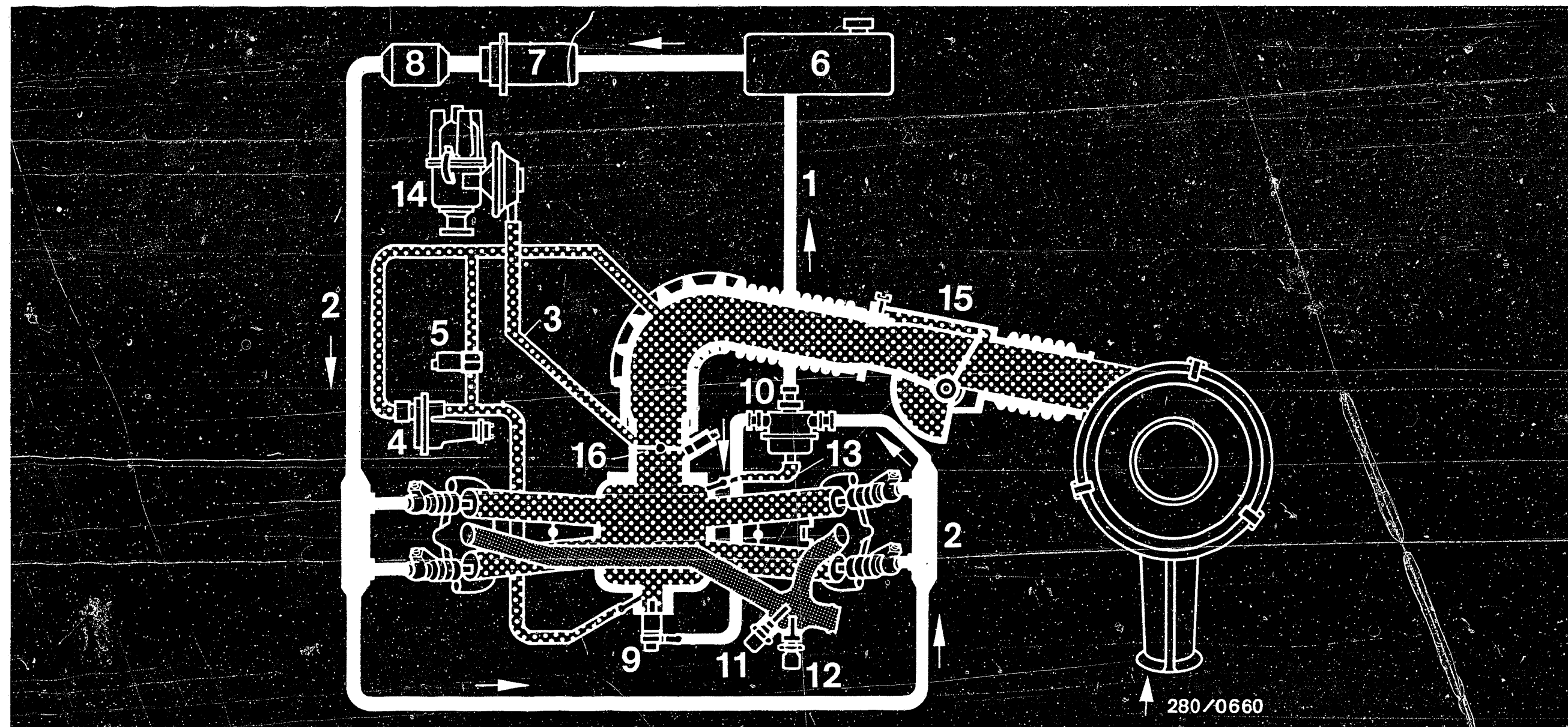


DIAGRAM OF AIR AND FUEL LINES

 Fuel

 Air (vacuum)

 Water

- 1 = Fuel return line
- 2 = Fuel delivery line
- 3 = Air hose between intake manifold and ignition distributor
- 4 = Auxiliary-air device
- 5 = Solenoid-operated air valve

- 6 = Fuel tank
- 7 = Electric fuel pump
- 8 = Fuel filter
- 9 = Start valve
- 10 = Pressure regulator
- 11 = Thermo-time switch
- 12 = Temperature sensor II

- 13 = Hose between intake manifold and pressure regulator
- 14 = Ignition distributor
- 15 = Air-flow sensor
- 16 = Throttle valve

A12

Diagram of air and fuel lines
Lancia Gamma i.e.



A13

Diagram of air and fuel lines
Lancia Gamma i.e.



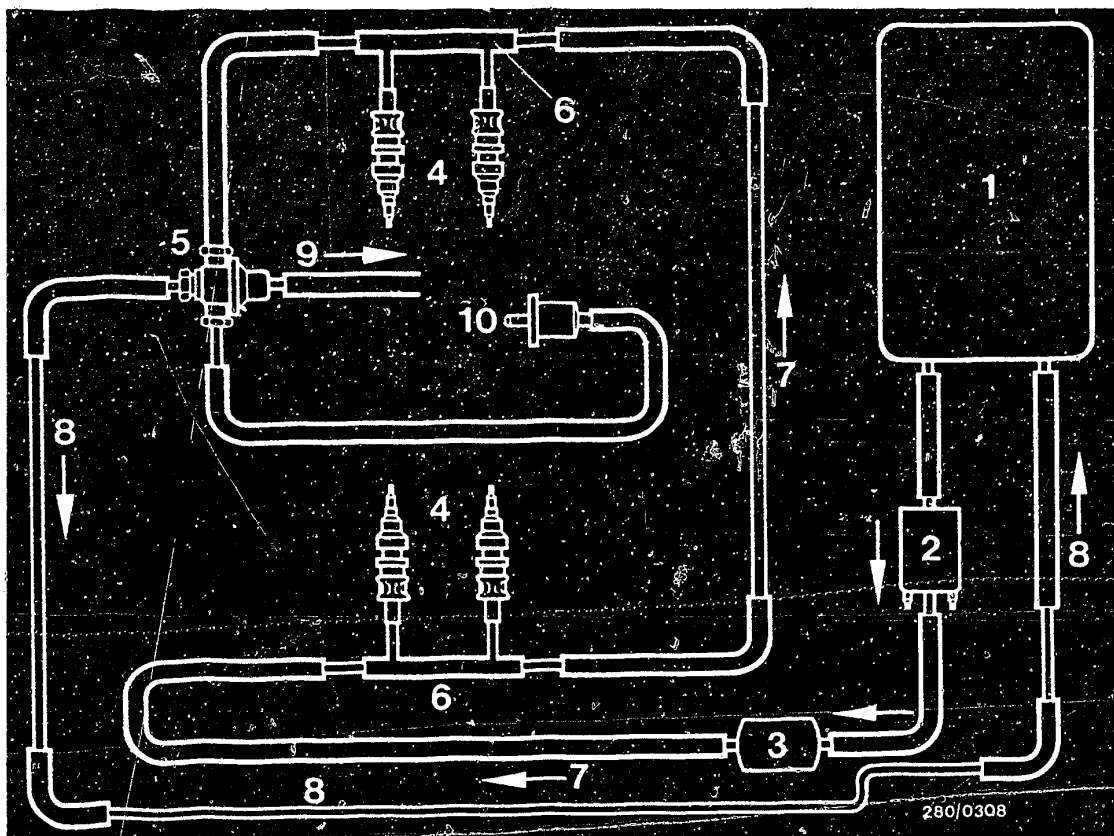


Diagram of fuel lines

- 1 = Fuel tank
- 2 = Electric fuel-pump
- 3 = Fuel filter
- 4 = Solenoid-operated injection valves
- 5 = Pressure regulator
- 6 = Fuel-distribution pipe
- 7 = Fuel delivery line
- 8 = Fuel return line
- 9 = To intake manifold
- 10 = Start valve

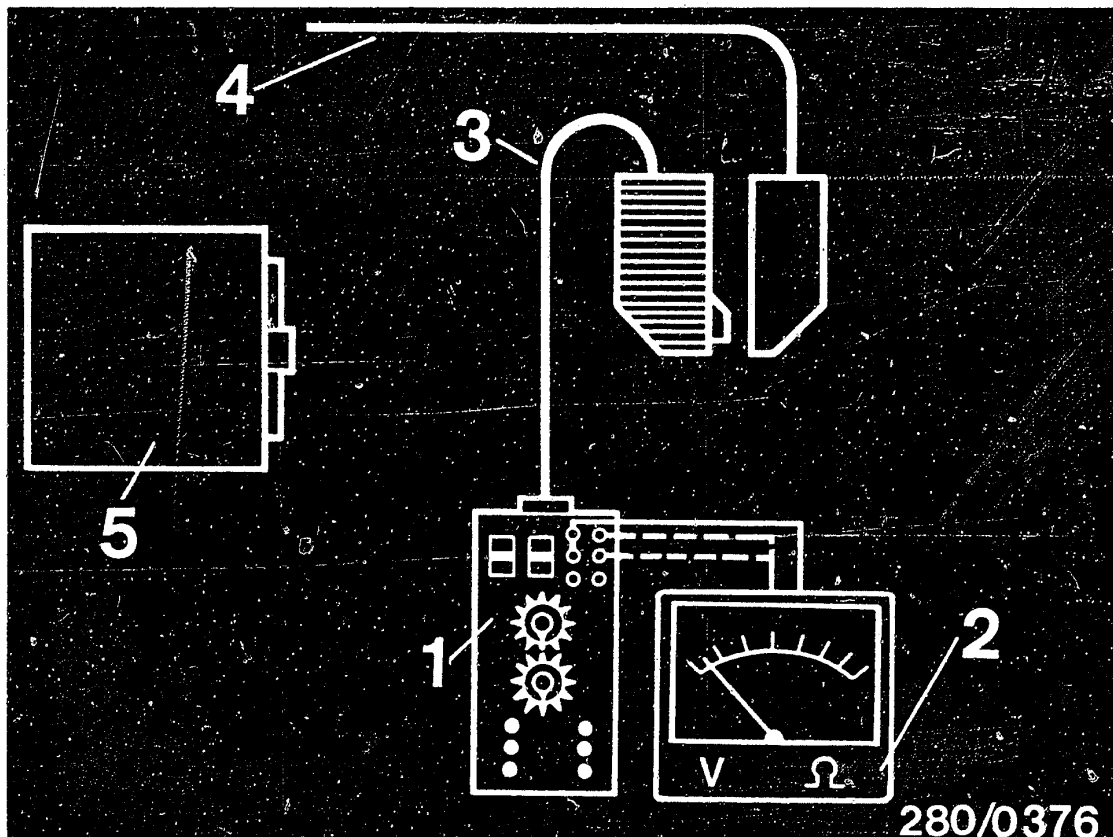


TEST EQUIPMENT AND TOOLS

<u>Description</u>	<u>Designation</u>	<u>Part no.</u>
Universal test adapter	ETT 018.01	0 684 101 801
Adapter lead		1 684 463 129
Motortester	e.g. MOT 002.00 MOT 300 MOT 400	0 684 000 200 0 684 000 300 0 684 000 400
Exhaust-gas analyzer	e.g. ETT 008.00	0 684 100 800
Calibrated infrared exhaust-gas analyzers	ETT 008.04 or ETT 008.05	0 684 100 804 0 684 100 805
Pressure gauge	Quality class 1.0 = 6 bar 0.1 bar graduations	1 687 231 154
Three-way line		KDJE-P-100/13
Test lead		1 684 463 093
Pressure tester or pressure tester (no longer available)		KDJE-P 100 KDEP-1034
Clamping fixture		1 688 120 093
Assembly mandrel		1 687 931 003
Parts set		1 287 010 701
Electrics tester or multimeter	e.g. ETE 014.00 e.g. Philips PM 2617 X e.g. Mislco Master 50 K e.g. Chinaglia Cortina	0 684 101 400
Solenoid-operated injection valve		0 280 150 151
Hexagon screw-driver	AF5 commercially available e.g. Hahn u. Kolb	No. 52 138

Use suitable, commercially available tools for fitting and removing the idle CO anti-tamper device on the air-flow sensor.





- | | |
|-------------------------------|-------------------------------|
| 1 = Universal test adapter | 4 = L-Jetronic wiring harness |
| 2 = Multimeter | |
| 3 = Adapter lead (L-Jetronic) | 5 = L-Jetronic control unit |

General:

Connect adapter lead to universal test adapter and connect to multiple plug of L-Jetronic wiring harness.

Caution:

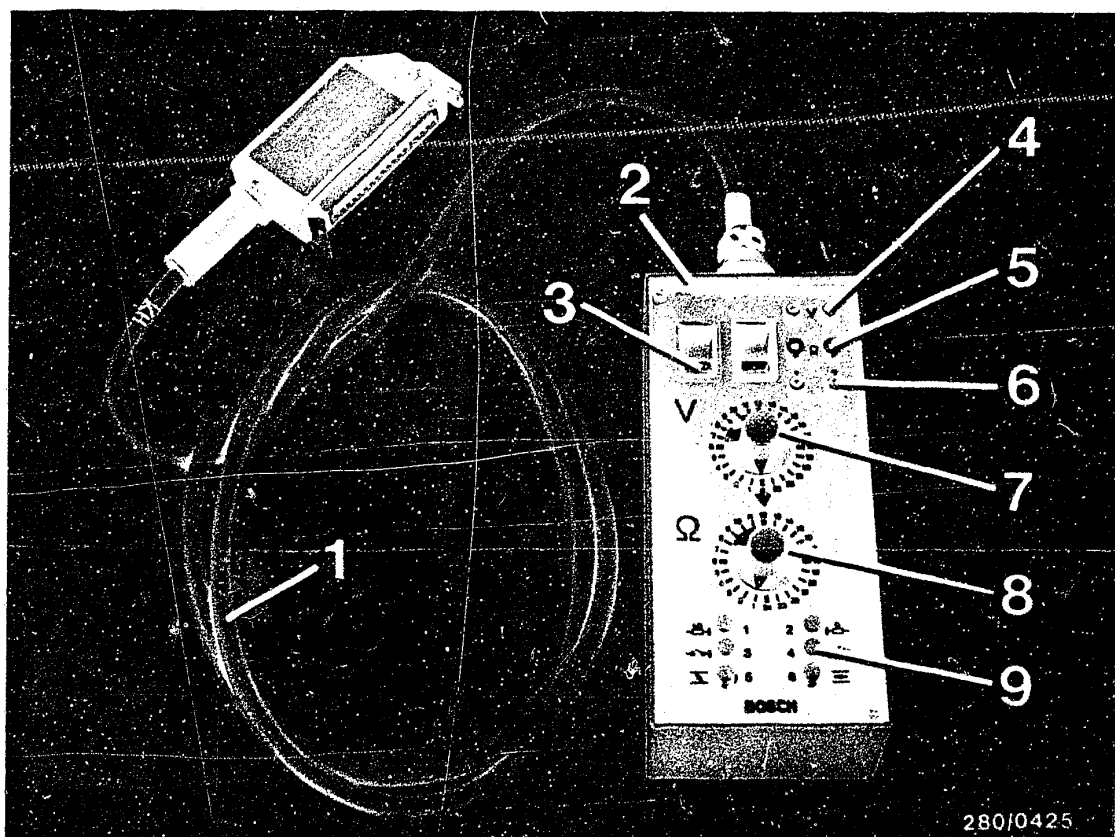
Connect and disconnect the universal test adapter only with the ignition off:

Testing:

For testing, connect a multimeter with R_i min. 20 k Ω /V to the test adapter.

It is also possible for the signal from term. 1 of the ignition coil to be measured with a motortester via the special input.

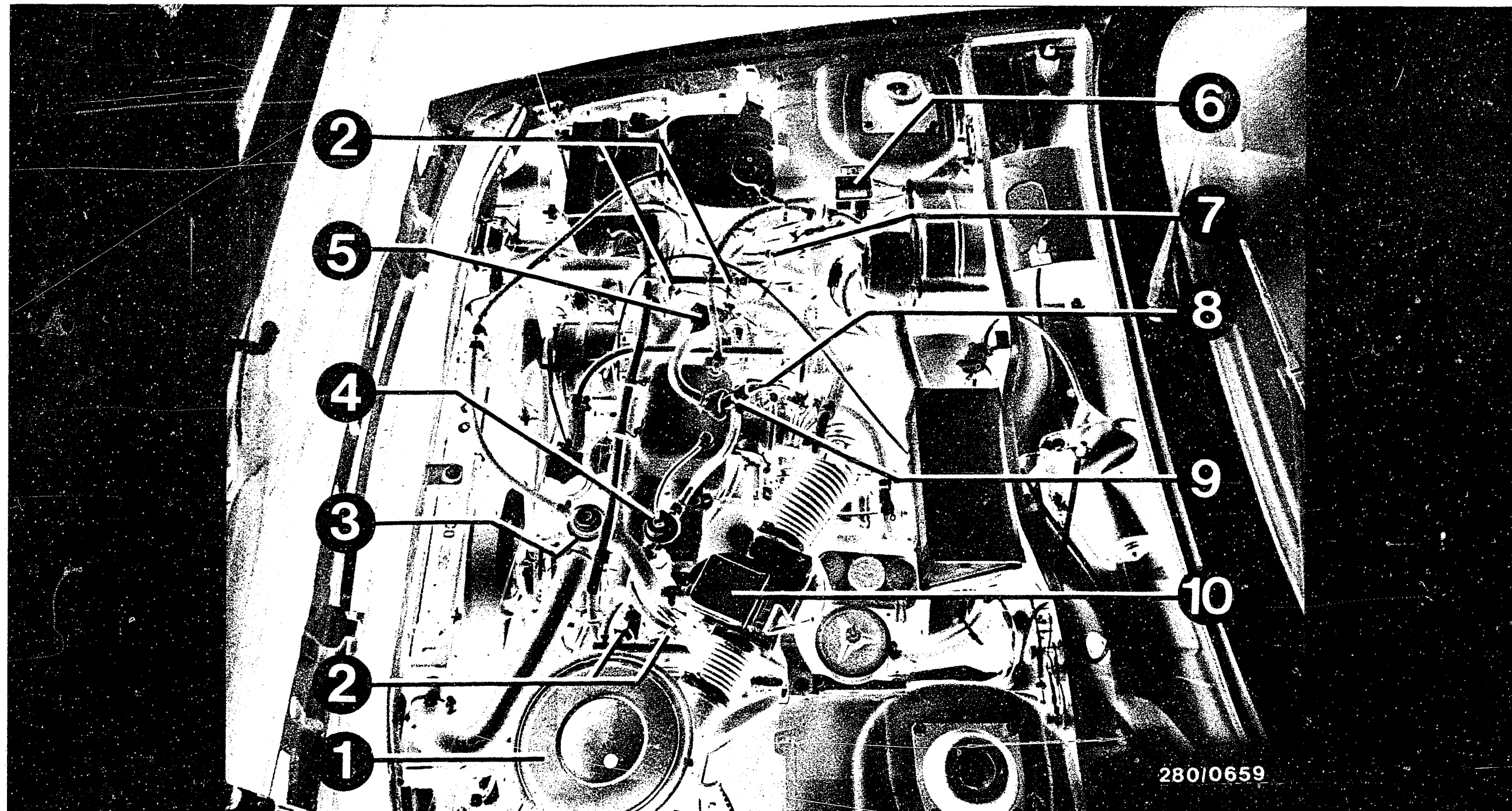




Universal adapter with adapter lead for L-Jetronic

- 1 = Adapter lead (Part No.: 1 684 463 129)
- 2 = Universal test adapter (Part No.: 0 684 101 801)
- 3 = Test wells (for motortester)
- 4 = Test sockets (for voltage measurement)
- 5 = Test sockets (for resistance measurement)
- 6 = Test sockets (not yet occupied)
- 7 = Program switch "volt"
- 8 = Program switch "ohm"
- 9 = Button panel (not occupied for L-Jetronic)





INSTALLATION POSITION OF COMPONENTS

- 1 = Air filter
- 2 = Injection valves
- 3 = Thermo-time switch (brown plug)
Temperature sensor II (white plug)

- 4 = Pressure regulator
- 5 = Auxiliary-air device
- 6 = Relay set
- 7 = Pump fuse

- 8 = Throttle-valve switch
- 9 = Start valve
- 10 = Air-flow sensor

A18

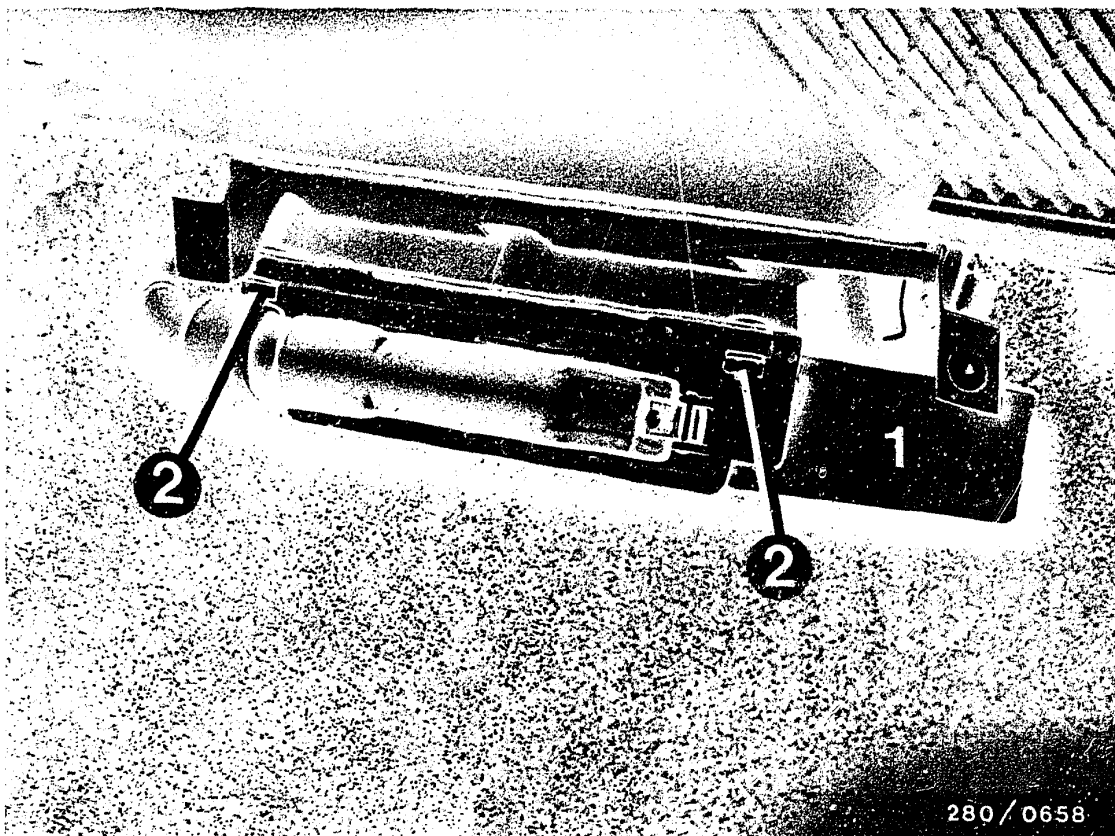
Installation position of components
Lancia Gamma i.e.



A19

Installation position of components
Lancia Gamma i.e.



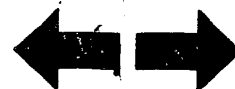


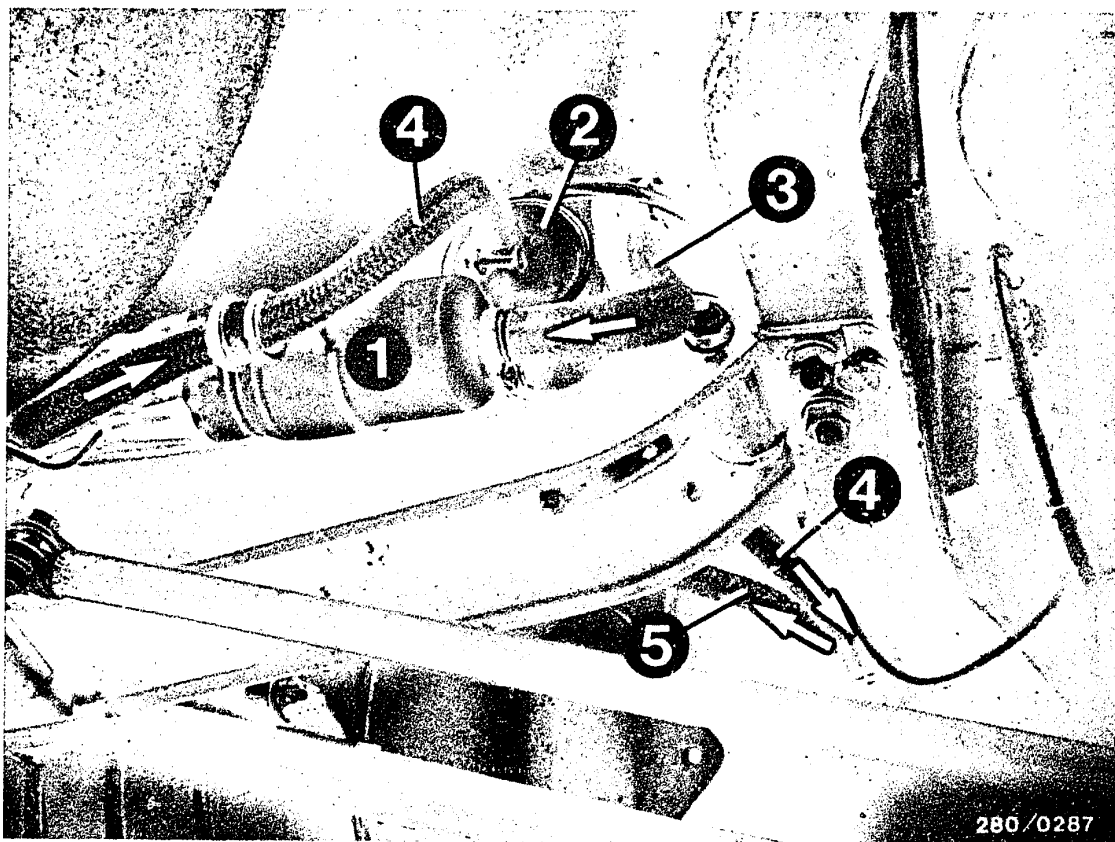
- 1 = Control unit
2 = Fastening screws

Installation position of components (continued)

The indications "right" and "left" always refer to the forward direction of travel.

The control unit is in the passenger compartment in the front-passenger footwell, under the glove compartment.





- 1 = Electric fuel pump
- 2 = Fuel filter
- 3 = Fuel intake line
- 4 = Fuel delivery line
- 5 = Fuel return line
- Arrow = Direction of fuel flow

Installation position of components (continued)

The electric fuel pump and the fuel filter are under the vehicle on the right-hand side near the rear axle.



Important general information

1. Never start engine without securely connected battery.
2. Do not use a starting aid with more than 16 V or a fast charger for starting.
3. Never disconnect battery from vehicle electrical system with engine running.
4. Disconnect battery from vehicle electrical system when fast charging.
5. Remove control unit at temperatures above 80°C (paint drying installation).
6. Ensure that all connectors of wiring harness are properly attached.
7. Never connect or disconnect wiring-harness plug of control unit with ignition switched on.
8. When testing compression, cut the red power supply lead between battery and relay set by disconnecting the plug-in connection.
This ensures that the voltage supply for the L-Jetronic and therefore also for the injection valves is interrupted. Undesired injecting is thus prevented.
9. Remove the L-Jetronic control unit before carrying out electric welding work (e.g. spot welding).
10. When using the following trouble-shooting program it is assumed that the engine is in proper working order and that the ignition is correctly set. The electrical system must be checked and, if necessary, repaired.
11. If an alarm system is installed, proceed according to microcard ALL-500.

In order to carry out the testing operations described in this manual and in order to assess the components, you should be familiar with the L-Jetronic and how it works. The essential points regarding the operation and construction of the L-Jetronic are described in Technical Instruction VDT-U 3/3 En.



Trouble-shooting

The following trouble-shooting programs are designed to enable workshop employees, using the universal test adapter with adapter lead (1 684 463 129) and other suitable test equipment, to quickly locate causes of trouble on the L-Jetronic. Depending on the level of knowledge and experience of the mechanic, a choice can be made between the following procedures:

- Detailed step-by-step trouble-shooting for employees with little experience or practice on L-Jetronic vehicles.
- Pin-pointed direct trouble-shooting for trained, experienced employees who have had a great deal of practice on L-Jetronic vehicles.

Both trouble-shooting programs begin by checking the electrical/electronic part of the L-Jetronic with the aid of the universal test adapter with adapter lead. In this way, the wiring harness with the connected components is soon checked for proper electrical operation and faults are quickly located.

If no fault is found using the universal test adapter, it is necessary to test the fuel pressure.

If no fault is found, continue trouble-shooting with the detailed or the direct trouble-shooting program.

B3

B5

B1

Trouble-shooting
Lancia Gamma i.e.



B2

Trouble-shooting
Lancia Gamma i.e.



1. Detailed step-by-step trouble-shooting

1.1 Test with universal test adapter with adapter lead 1 684 463 129

This test must come at the beginning of the test program and must be performed from beginning to end (Coordinates B9...D15).

1.2 Fuel pressure test

This test must come immediately after the test with the universal test adapter and must be performed from beginning to end (Coordinates D16...E 2).

1.3 Trouble-shooting according to customer complaints (symptoms of trouble)

The table below contains possible symptoms of trouble and gives the first coordinate of the relevant detailed trouble-shooting program in the column on the right.

The trouble-shooting program consists of logically ordered test procedures for all individual components of the L-Jetronic. If, after completing the trouble-shooting program for an assumed trouble, the fault has not been detected or remedied, take a new symptom of the trouble and work through another program.

<u>Customer complaints (symptoms of trouble)</u>	<u>Universal test adapter</u>	<u>Fuel pressure test</u>	<u>Coordinate</u>
1. Engine fails to start or starts only with difficulty	B 9	D 16	E 3
2. Engine starts but then dies	B 9	D 16	E 19
3. Uneven engine idle	B 9	D 16	F 7
4. Poor throttle take-up	B 9	D 16	G 7
5. Engine missing under all operating conditions	B 9	D 16	H 1
6. Fuel consumption too high	B 9	D 16	J 1
7. No maximum engine power, top speed not reached	B 9	D 16	J 11
8. CO concentration at idle too high or too low	B 9	D 16	K 1

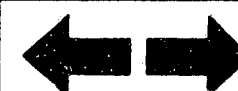
B3

Trouble-shooting
Lancia Gamma i.e.



B4

Trouble-shooting
Lancia Gamma i.e.



2. Pin-pointed direct trouble-shooting

2.1 Test with universal test adapter with adapter lead 1 684 463 129

The test with the universal test adapter must come at the beginning of the test program and must be performed from beginning to end (Coordinates B 9...D15).

2.2 Fuel pressure test

The fuel pressure test must come immediately after the test with the universal test adapter and must be performed from beginning to end (Coordinates D16...E 2).

2.3 Trouble-shooting according to customer complaints

The table below contains various symptoms of trouble with several possible causes of the trouble in each case. The coordinate reference field indicates the first coordinate of the test procedure for the respective L-Jetronic component. If, after testing the individual components, the fault has not been detected or remedied, choose a new symptom of the trouble.

Customer complaint (symptom of trouble)

1. Engine fails to start or starts only with great difficulty								
2. Engine starts but then dies								
3. Uneven engine idle, idle speed incorrect								
4. Poor throttle take-up								
5. Engine missing under all operating conditions								
6. Fuel consumption too high								
7. No maximum engine power								
8. CO concentration at idle too high or too low								
Cause (component fault)								
B9	B9	B9	B9	B9	B9	B9	B9	Universal test adapter
D16	D16	D16	D16	D16	D16	D16	D16	Fuel pressure test: Pressure regulator defective, relay set defective, electric fuel pump not operating, pump contact not closing.
E11	E23		G11					Auxiliary-air device not opening.
		F15						Auxiliary-air device not closing
E15	F 3	F23	G13	H 5	J 7	J19	K 5	Air-flow sensor defective, potentiometer test (noise test)
	F 3			H 9				Pump contact in air-flow sensor defective (engine stopped)
		G 1						Solenoid-operated air valve defective (if applicable)

Continued on B7/B8

B5

Trouble-shooting
Lancia Gamma i.e.



B6

Trouble-shooting
Lancia Gamma i.e.



Customer complaints (symptoms of trouble)

1. Engine fails to start or starts only with great difficulty								
2. Engine starts but then dies								
3. Uneven engine idle, idle speed incorrect								
4. Poor throttle take-up								
5. Engine missing under all operating conditions								
6. Fuel consumption too high								
7. No maximum engine power								
8. CO concentration at idle too high or too low								
Cause (component fault)								
E 9		F11						Thermo-time switch defective
E17	F 5	G 3	G17			J21	K11	Air-intake system leaking
		F17		H13	J 7			Solenoid-operated injection valves defective; connect test lead; replace injection valve.
E 5								Start valve not opening
E 7	E21	F13			J 3		K 7	Start valve leaking
				H19		J17		Fuel delivery too low
E13	F 1				J 5		K 7	Temperature sensor II in engine defective
		F 9	G 9	H21				Throttle valve not closing
						J13		Throttle valve not opening fully
				H 3		J21		Poor central ground, loose contacts, faulty plug-in connections
E17		G 3		H 3				Open circuit in wiring harness and plug-in connections; interference; missing
		F 9	G 9			J15		Throttle-valve switch defective
		F11	G19		J 9		K 3	CO exhaust-gas setting too rich, idle adjustment
		F11	G19	H23			K 3	CO exhaust-gas setting too lean, idle adjustment
				H19		J15		Control unit defective

B7

Trouble-shooting
Lancia Gamma i.e.



B8

Trouble-shooting
Lancia Gamma i.e.



TEST CHART FOR UNIVERSAL TEST ADAPTER
with connected L-Jetronic system adapter lead
(1 684 463 129)

Test chart for Lancia Gamma 2.5 1 (as of 6.80)

Disconnect multiple plug from control unit and connect to plug of adapter lead (ignition must be off). Only the peripherals are tested.

To make the measurements, connect a multimeter for voltage and resistance measurements as well as a motor-tester to the universal test adapter.

The individual test steps are selected by means of two program switches (one for voltage measurements, the other for resistance measurements). Each program switch has 24 test positions, but not all of these are occupied for the L-Jetronic. Be sure to follow the instructions in the test chart.

Test steps 1...10 measure voltages during starting.
Caution: Set the multimeter to the voltage range.

Test steps 11...19 measure resistances.

Caution:

Set the multimeter to the resistance measuring range.

While trouble-shooting, ignition "OFF" and remove multiple plug of adapter lead.

The test specifications and operating instructions for the universal test adapter are given in the following test chart.

Installation position of control unit:

In passenger compartment, front passenger side, in footwell under glove compartment. It is secured by three screws.



Requirements for correct test procedure:

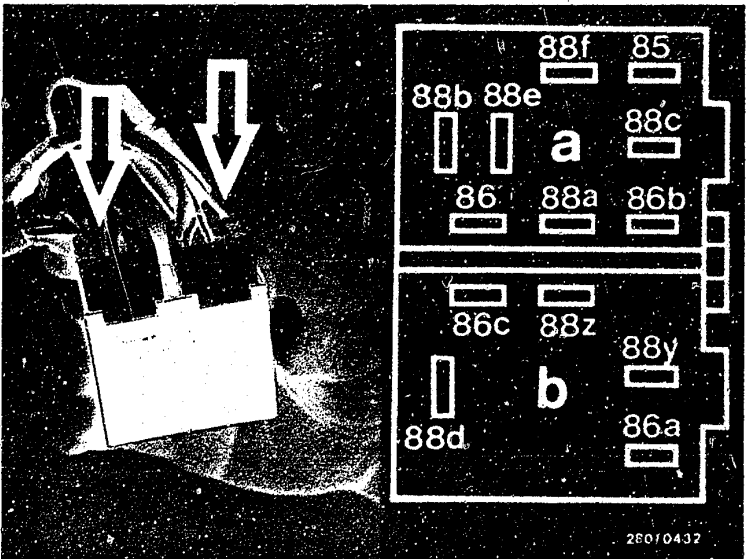
1. Start testing with test step 1.
2. The sequence of the test steps must be kept to. In each case, the trouble-shooting set out below each test step is based on the trouble-shooting set out below the previous test steps.
Example: If, in test step 1, the ground connection term. 28 for the relay set is tested, this test is not repeated in the following test steps.
3. If an incorrect reading is obtained for a test step, this test step must be repeated after the fault has been remedied.

Note:

In the following test steps a white border in the "Operation" column indicates which operation has to be changed in comparison with the preceding test step.

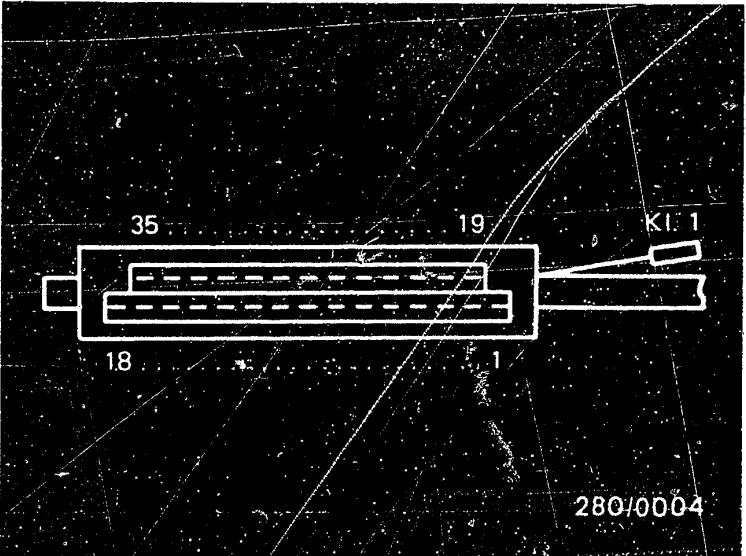


Test step 1			
Operation		Reading	Testing
Program switch position "V":	3	Multimeter must indicate 8 ... 15 V.	<u>Component:</u> Relay set Starting motor term. 50
Program switch position: "Ω"	1)		
Measuring equipment: Multimeter (Volt range)			
Measuring range: 0...15 V		<div>yes</div> <div>no</div>	<u>Operation:</u> Starting signal
Connection: Test sockets red (+) and black (-)			
Operation in vehicle: Ignition "ON" and operate starting motor			
		Continue testing with next test step.	<u>Malfunction:</u> No voltage reading



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug
K1.1 = Term. 1



Trouble-shooting:
For all voltage measurements:
1. Set value 8...15 V (when operating starting motor).
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.
For resistance measurements:
For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.
Important! Ignition "OFF" and ensure proper electrical connection when measuring.
1) Switch position not specified

Continued on B13/B14

Voltage reading below 8 V:

Battery insufficiently charged or high voltage drops.

No voltage reading:

1. Voltage at relay set term. 86a? If no voltage, test lead to starting motor term. 50. Test ground connection from multiple plug term. 5 to central ground.
2. Voltage at relay set term. 86? If no voltage, replace relay set.
3. Test lead from relay set term. 86 to multiple plug term. 4.

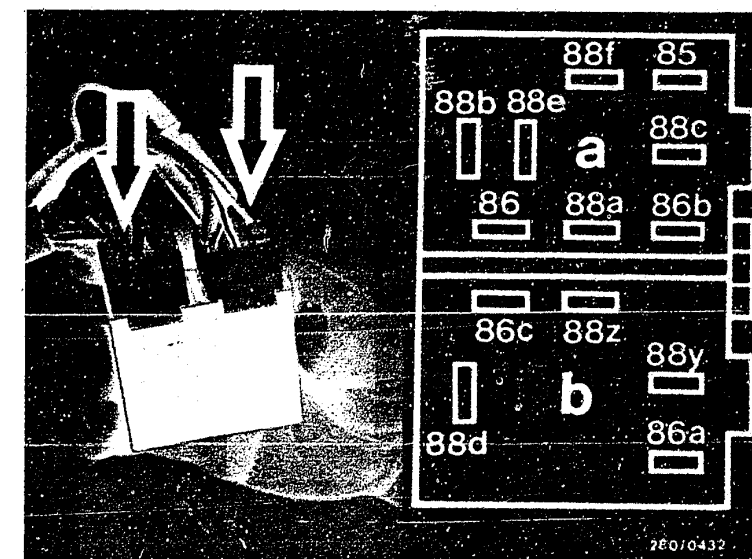
Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: In engine compartment on right on inside fender.

Central ground: In engine compartment under throttle-valve switch on transmission housing.

Control unit: Front passenger side in footwell under glove compartment.



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

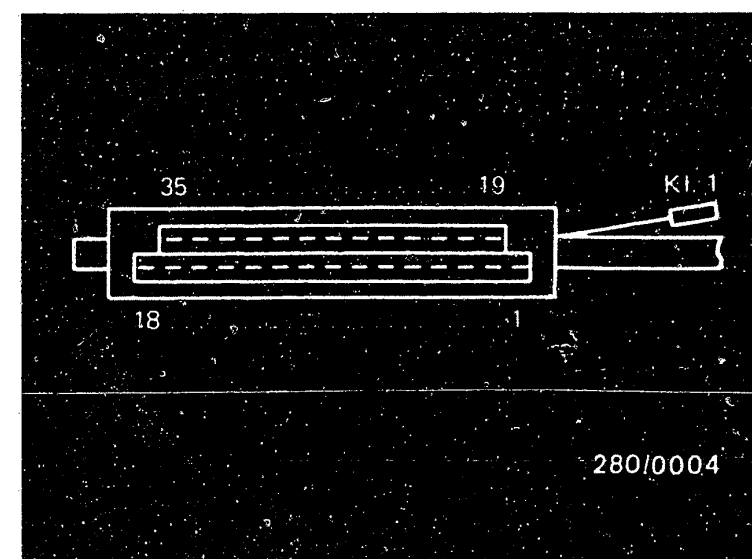
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

Kl. 1 = Term. 1



B13

Test chart for universal test adapter

Lancia Gamma i.e.



B14

Test chart for universal test adapter

Lancia Gamma i.e.



Test step 2		Reading	Testing
Operation			
Program switch position "V":	4	Multimeter must indicate 8 ... 15 V.	Component: Auxiliary-air device, relay set
Program switch position: "Ω"	-		
Measuring equipment: Multimeter (Volt range)		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> yes ↓ Continue testing with next test step. </div> <div style="text-align: center;"> no ↓ </div> </div>	Operation: Power supply Malfunction: No reading
Measuring range: 0 ... 15 V			
Connection: Test sockets red (+) and black (-)			
Operation in vehicle: Ignition "ON" and operate starting motor			

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor).
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

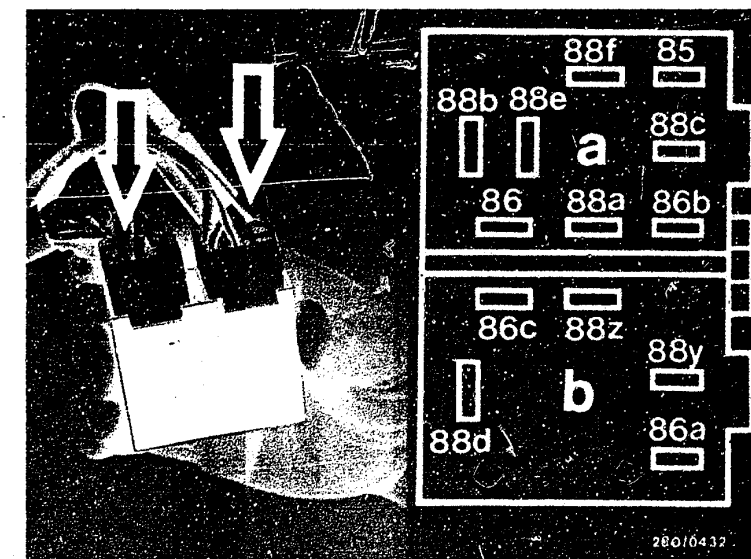
For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

a) Start engine; electric fuel pump operates.

1. Voltage at relay set term. 88c? If no voltage, test lead 28 from relay set term. 85 to multiple plug term. 28 and multiple plug term. 16 to central ground. If fault not eliminated, replace relay set.

Continued on B17/B18



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

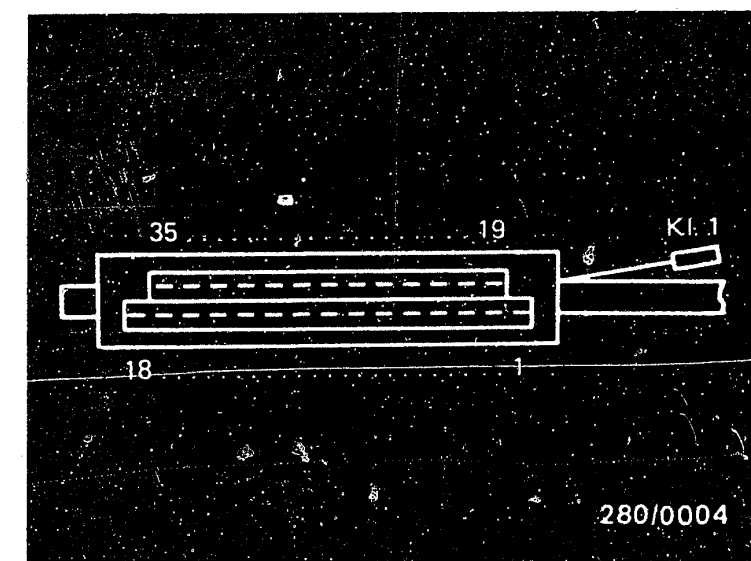
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

Kl. 1 = Term. 1



B 15

Test chart for universal test adapter
Lancia Gamma i.e.



B 16

Test chart for universal test adapter
Lancia Gamma i.e.



Trouble-shooting (continued)

2. Voltage at auxiliary-air device term. 48? If no voltage, test lead 48 from auxiliary-air device to relay set term. 88c.
3. Test auxiliary-air device for continuity. Set value 25 ... 60 Ω . If not, replace auxiliary-air device.
4. Test lead 34 from auxiliary-air device to multiple plug term. 34.

b) Crank engine; electric fuel pump does not operate

1. Voltage at relay set term. 88y? If no voltage, test pump fuse and power supply term. 30.
2. Voltage at relay set term. 88d? If no voltage, replace relay set.
3. Test electric fuel pump and leads (ground connection).
4. Voltage at relay set term. 88c? If no voltage, test lead 28 from relay set term. 85 to multiple plug term. 28 and multiple plug term. 16 to central ground. If fault not eliminated, replace relay set.
5. Voltage at auxiliary-air device term. 48? If no voltage, test lead 48 from auxiliary-air device to relay set term. 88c.
6. Test auxiliary-air device for continuity. Set value 25 ... 60 Ω . If not, replace auxiliary-air device.
7. Test lead 34 from auxiliary-air device to multiple plug term. 34.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Relay set: In engine compartment on right on inside fender.

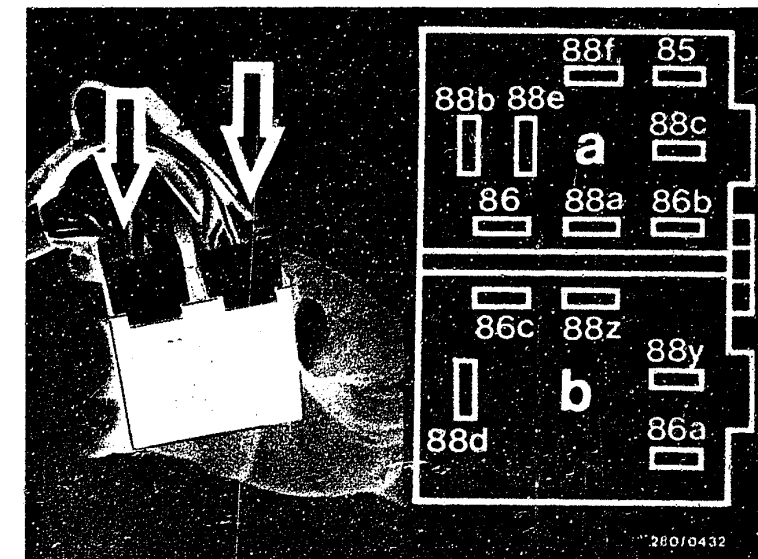
Control unit: Front passenger side in footwell under glove compartment.

Auxiliary-air device: On right near intake manifold.

Fuel pump fuse: "Cable-to-cable" fuse under relay set.

Electric fuel pump: Under vehicle on right, near rear axle.

Ground lead of electric fuel pump: In luggage compartment on right, near rear lamp.



Measure voltage on back of plug.

Relay set

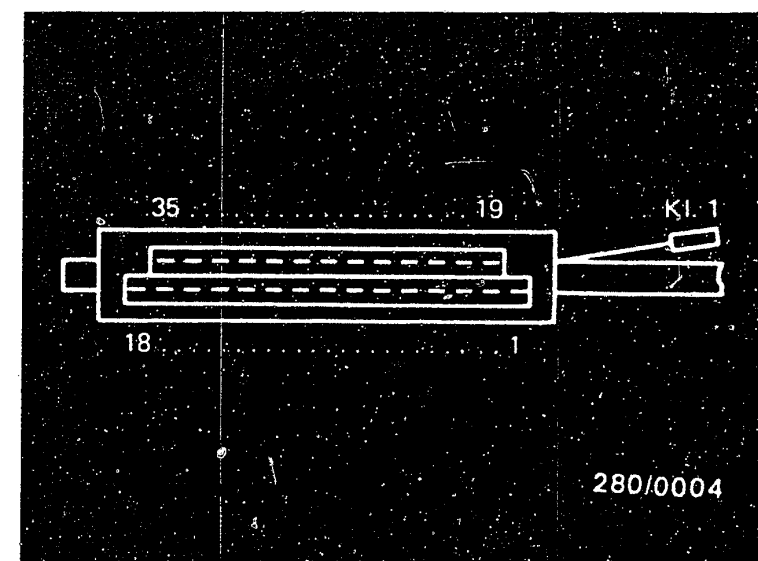
0 332 514 121

a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set 0 332 514 105)

Top view of multiple plug
Kl. 1 = Term. 1



B17

Test chart for universal test adapter
Lancia Gamma i.e.



B18

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 3		
Operation	Reading	Testing
Program switch position "V":	5	<u>Component:</u> Signal from term. 1
Program switch position: "Ω"	-	
<u>Measuring equipment:</u> Motortester	<div> <div>yes</div> <div>Continue testing with next test step.</div> </div> <div>no</div>	<u>Operation:</u> Triggering of control unit by the ignition.
<u>Measuring range:</u> Special input, control lever all the way to the left Measuring range 20 V		<u>Malfunction:</u> No reading
<u>Connection:</u> Test wells		
<u>Operation in vehicle:</u> Ignition "ON" and operate starting motor		

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor).
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

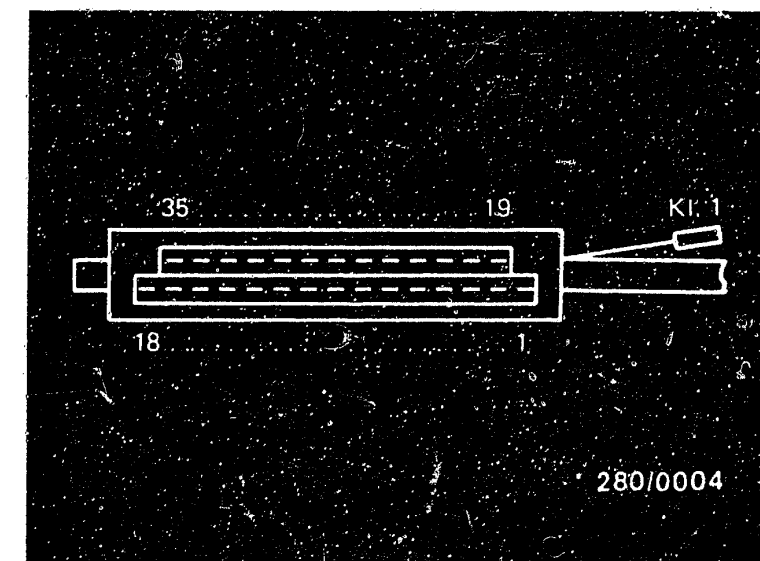
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Lead from multiple plug term. 1 to ignition coil term. 1 dropped off?

Test and, if necessary, repair.

Voltage at ignition coil term. 1? If not, check ignition system. If voltage present, test lead 1 for continuity or for short circuit to ground.

If the lead is O.K., then the trigger stage in the control unit has failed. Replace control unit.



Top view of multiple plug
KI. 1 = Term. 1

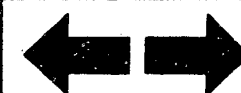
Installation position of components:

Control unit:

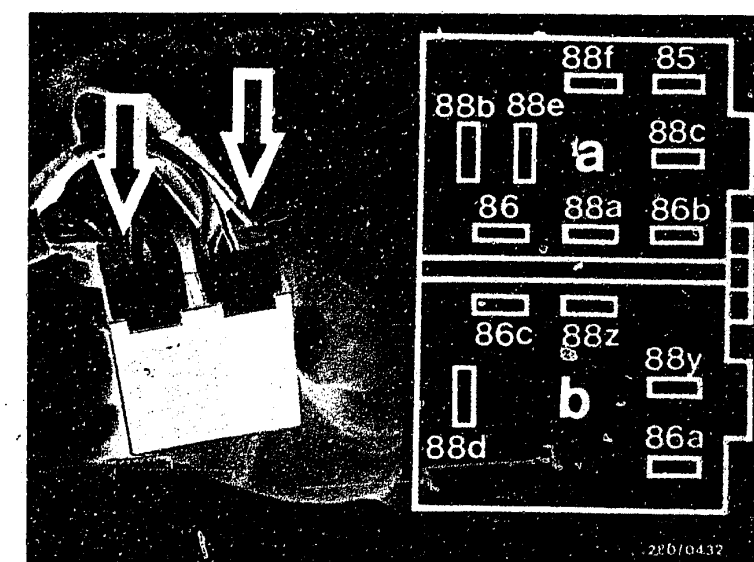
Front passenger side, in footwell under glove compartment.

Central ground:

In engine compartment under throttle-valve switch on transmission housing.

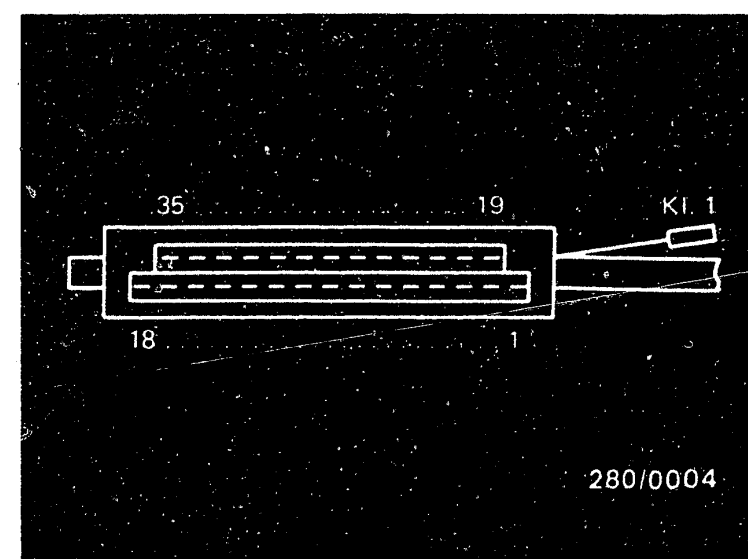


<u>Test step 4</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position "V":</u>	6	Multimeter <u>must</u> indicate <u>8 ... 15 V .</u>	<u>Component:</u> Relay set, power supply
<u>Program switch position: "Ω"</u>	-		
<u>Measuring equipment:</u> Multimeter (Volt range)		<div><div>yes</div><div>↓</div><div>Continue testing with <u>next test step.</u></div></div> <div><div>no</div><div>↓</div><div></div></div>	<u>Operation:</u> Power supply
<u>Measuring range:</u> 0...15 V			<u>Malfunction:</u> No voltage reading
<u>Connection:</u> Test sockets red (+) and black (-)			
<u>Operation in vehicle:</u> Ignition "ON"			



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug
K1. 1 = Term. 1



Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

1. Voltage at relay set term. 86c? If not, check lead term. 15.
2. Voltage at relay set term. 88z? If not, test lead to battery (positive terminal).
3. Voltage at relay set term 88a? If not, replace relay set.
4. Test lead 10 from relay set term. 88a to multiple plug term. 10 for continuity. Eliminate contact resistances at the plug-in connections.

B21

Test chart for universal test adapter
Lancia Gamma i.e.

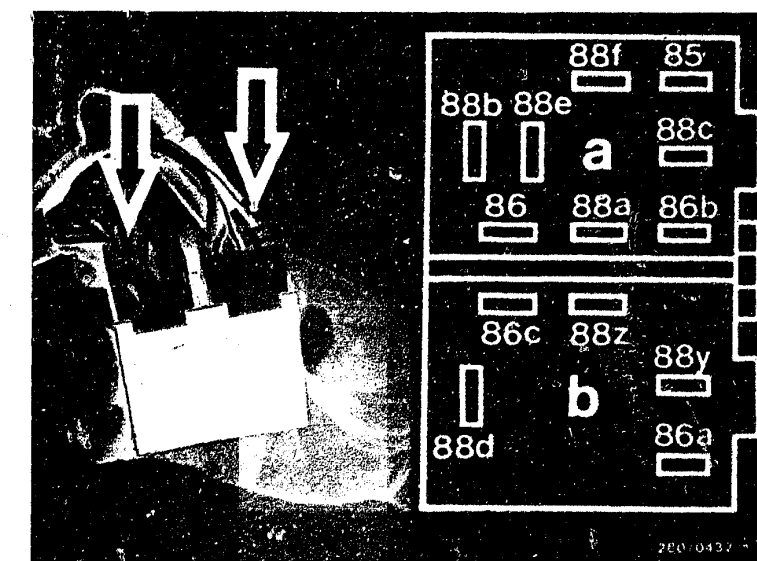


B22

Test chart for universal test adapter
Lancia Gamma i.e.

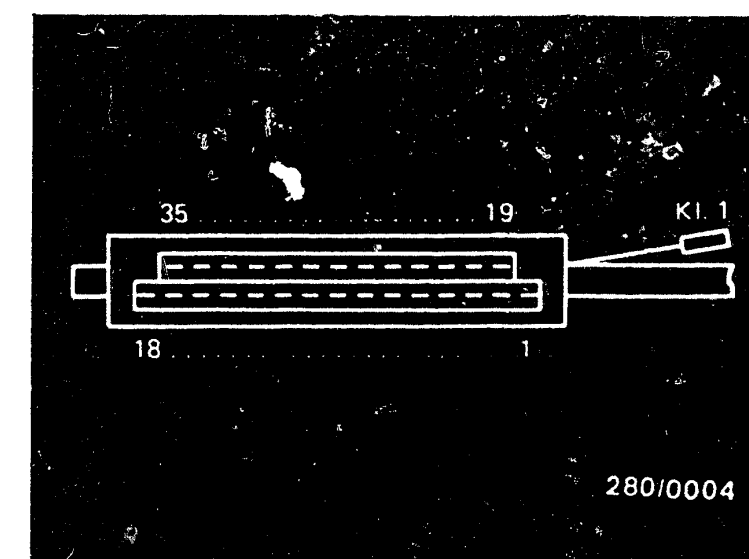


<u>Test step 5</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch position "V":</u>	7	Multimeter must indicate <u>8 ... 15 V.</u>	<u>Component:</u> Control unit Relay set
<u>Program switch position: "Ω"</u>	-		
<u>Measuring equipment:</u> Multimeter (Volt range)		<div>yes</div> <div>Continue testing with <u>next test step.</u></div> <div>no</div>	<u>Operation:</u> Power supply to 1st solenoid-operated injection valve
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test sockets red (+) and black (-)			<u>Malfunction:</u> No voltage reading
<u>Operation in vehicle:</u> Ignition "ON"			



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug
Kl. 1 = Term. 1



Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V.
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C1/C2

B23

Test chart for universal test adapter
Lancia Gamma i.e.



B24

Test chart for universal test adapter
Lancia Gamma i.e.



Trouble-shooting (continued)

1. Voltage at relay set term. 88e? If not, replace relay set.
2. Test plug-in connection at 1st solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 37? If not, test lead from injection valve connector to relay set term. 88e.
4. Test lead 15 from injection valve connector to multiple plug term. 15 for continuity.

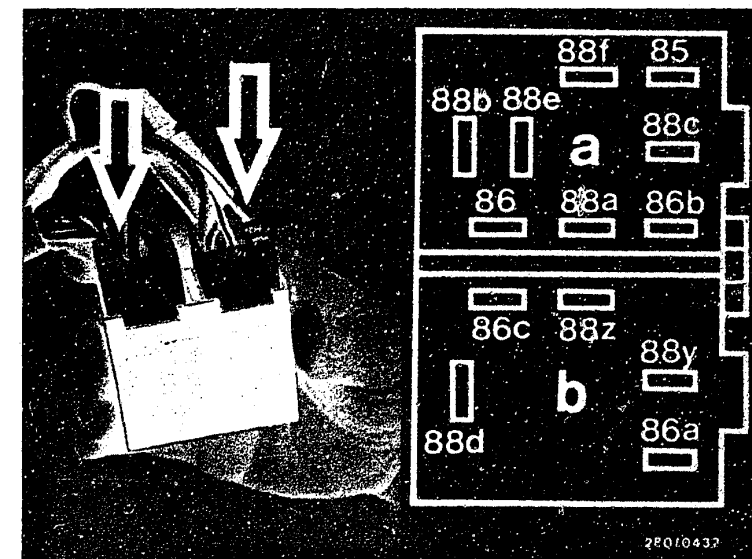
Eliminate contact resistances at the plug-in connections.

Installation position of components:

Relay set: In engine compartment on right on inside fender.

Control unit: Front passenger side in footwell under glove compartment.

Injection valve: Between intake manifold and engine block (2 on left, 2 on right).



Measure voltage on back of plug.

Relay set

0 332 514 121

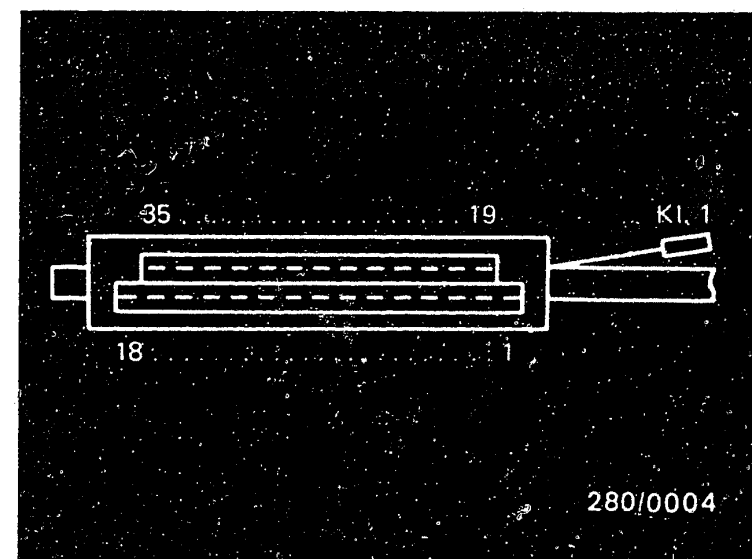
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug
Kl. 1 = Term. 1



C1

Test chart for universal test adapter
Lancia Gamma i.e.



C2

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 6			
Operation		Reading	Testing
<u>Program switch position "V":</u>	8	Multimeter must indicate	<u>Component:</u> Control unit, Relay set
<u>Program switch position: "Ω"</u>	-	<u>8 ... 15 V.</u>	
<u>Measuring equipment:</u> Multimeter (Volt range)		<div><div></div><div>yes</div><div>Continue testing with <u>next test step.</u></div></div> <div><div></div><div>no</div><div></div></div>	<u>Operation:</u> Power supply to 2nd solenoid-operated injection valve
<u>Measuring range:</u> 0...15 V			
<u>Connection</u> Test sockets red (+) and black (-)			
<u>Operation in vehicle:</u> Ignition "ON"			<u>Malfunction:</u> No voltage reading

Trouble-shooting:

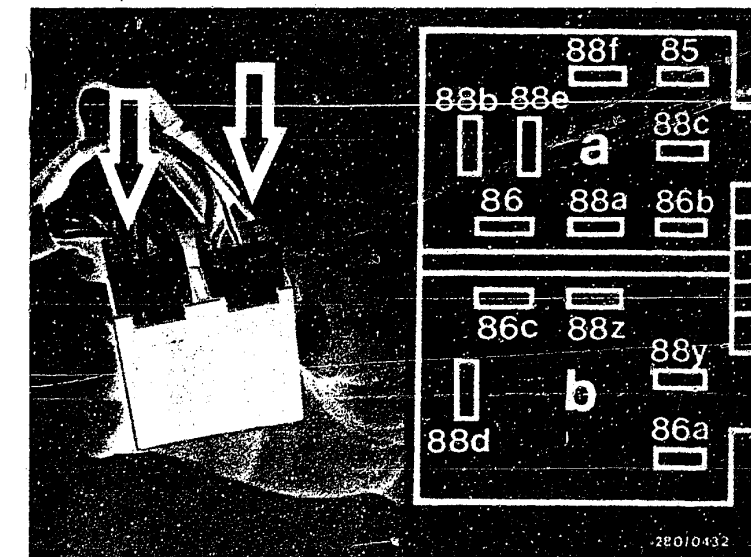
For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

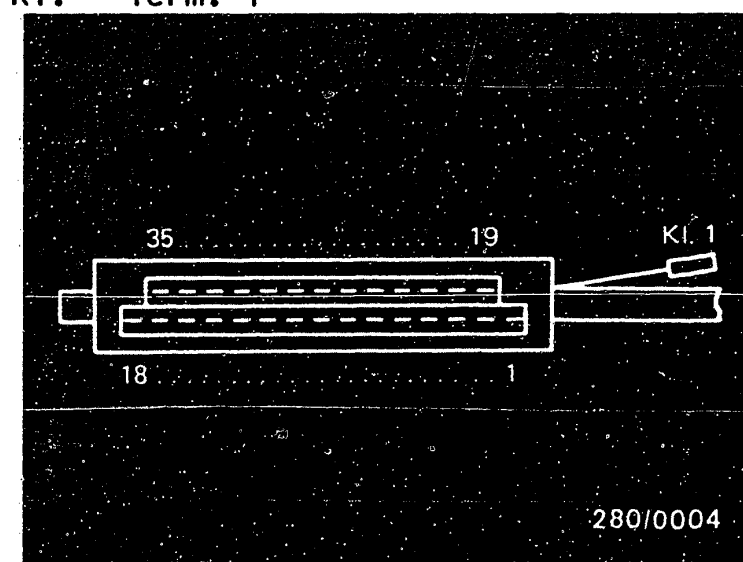
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

Kl. = Term. 1



Continued on C5/C6

C3

Test chart for universal test adapter
Lancia Gamma i.e.



C4

Test chart for universal test adapter
Lancia Gamma i.e.



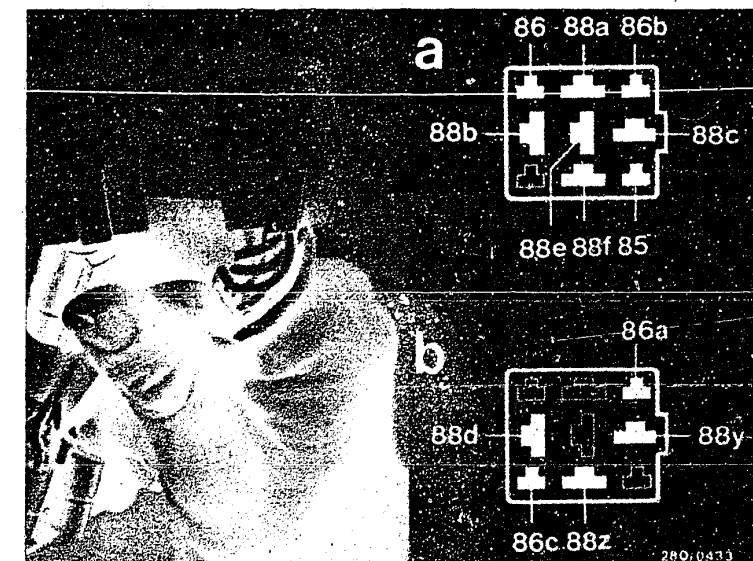
Trouble-shooting (continued)

1. Voltage at relay set term. 88e? If not, replace relay set.
2. Test plug-in connection on 2nd solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 38? If not, test lead from injection valve connector to relay set term. 88e.
4. Test lead 33 from injection valve connector to multiple plug term. 33 for continuity.

Eliminate contact resistances at the plug-in connections.

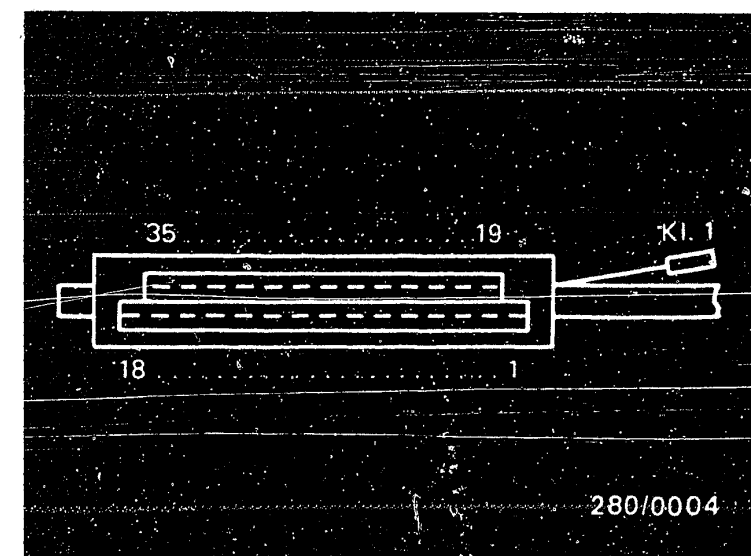
Installation position of components:

- Relay set: In engine compartment on right on inside fender.
- Control unit: Front passenger side in footwell under glove compartment.
- Injection valve: Between intake manifold and engine block (2 on left, 2 on right).



Measure voltage on back of plug.
 Relay set
 0 332 514 121
 a = Jetronic wiring harness
 b = Vehicle wiring harness
 (No term. 88f on relay set
 0 332 514 105)

Top view of multiple plug
 Kl. 1 = Term. 1



C5

Test chart for universal test adapter
 Lancia Gamma i.e.



C6

Test chart for universal test adapter
 Lancia Gamma i.e.



Test step 7		
Operation		Reading
Program switch position "V":	9	Multimeter must indicate 8 ... 15 V.
Program switch position: "Ω"	-	
Measuring equipment: Multimeter (Volt range)		
Measuring range: 0 ... 15 V		
Connection Test sockets red (+) and black (-)		
Operation in vehicle: Ignition "ON"		yes ↓ Continue testing with next test step.
		no ↓
		Testing
		Component: Control unit, Relay set
		Operation: Power supply to 3rd solenoid-operated injection valve
		Malfunction: No voltage reading

Trouble-shooting:

For all voltage measurements:

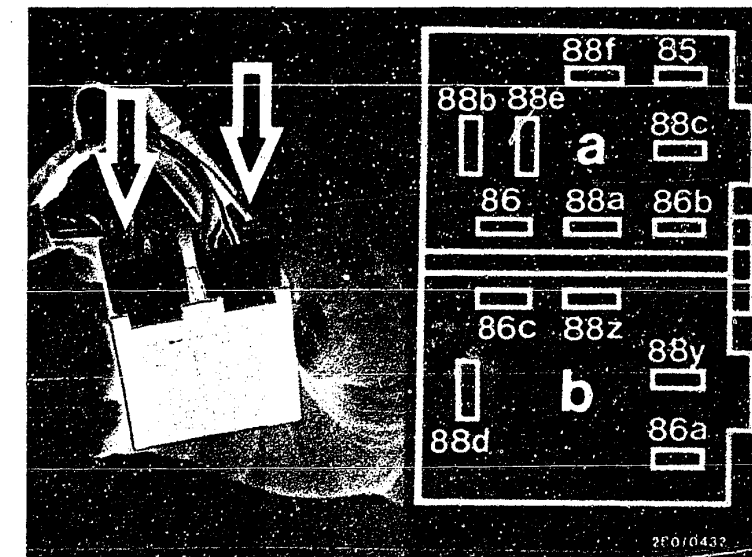
1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C9/C10



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

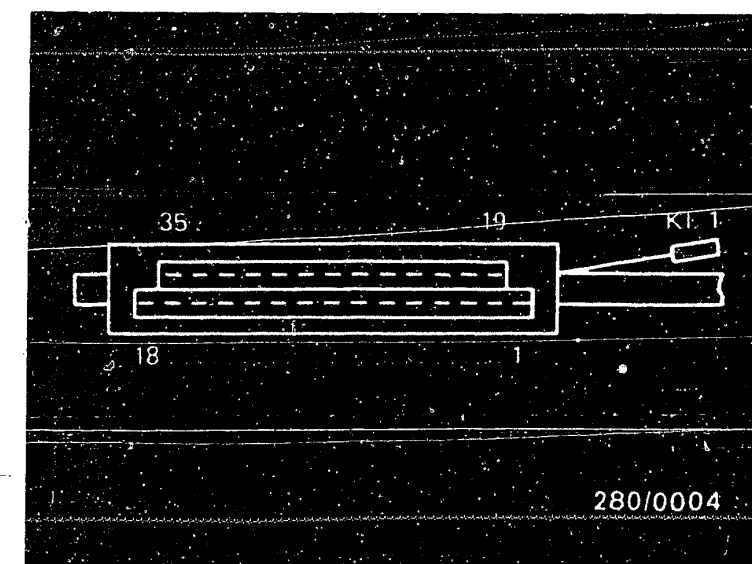
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

K1. 1 = Term. 1



C7

Test chart for universal test adapter

Lancia Gamma i.e.



C8

Test chart for universal test adapter

Lancia Gamma i.e.



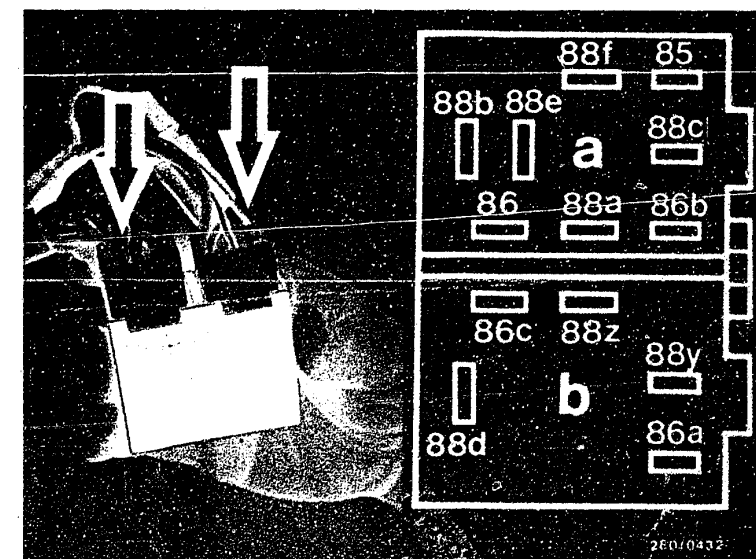
Trouble-shooting (continued)

1. Voltage at relay set term. 88b? If not, replace relay set.
2. Test plug-in connection on 3rd solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 40? If not, test lead from injection valve connector to relay set term. 88b.
4. Test lead 32 from injection valve connector to multiple plug term. 32 for continuity.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

- Relay set: In engine compartment on right on inside fender.
- Control unit: Front passenger side in footwell under glove compartment.
- Injection valve: Between intake manifold and engine block (2 on left, 2 on right).



Measure voltage on back of plug.

Relay set

0 332 514 121

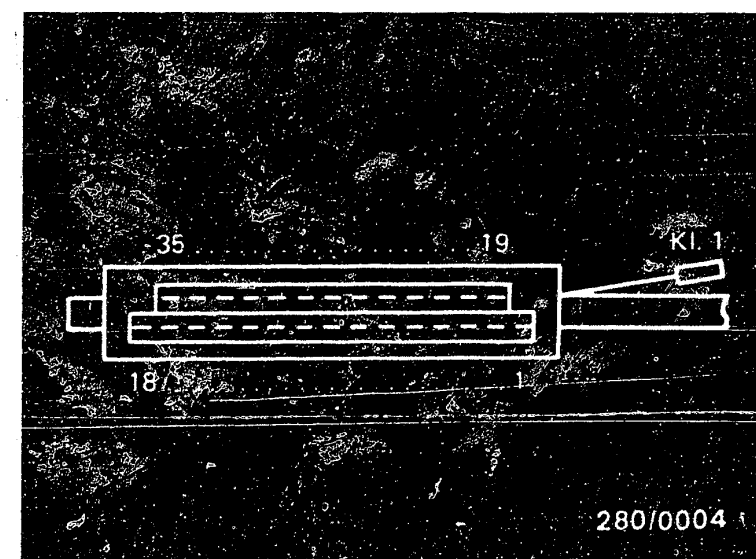
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug
Kl. 1 = Term. 1



C9

Test chart for universal test adapter
Lancia Gamma i.e.



C10

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 8			
Operation		Reading	Testing
<u>Program switch position "V":</u>	10	Multimeter must indicate 8 ... 15 V.	<u>Component:</u> Control unit, Relay set
<u>Program switch position: "Ω"</u>	-		
<u>Measuring equipment:</u> Multimeter (Volt range)		<div><div>yes</div><div>no</div></div>	<u>Operation:</u> Power supply to 4th solenoid-operated injection valve
<u>Measuring range:</u> 0 ... 15 V			
<u>Connection:</u> Test sockets red (+) and black (-)			
<u>Operation in vehicle:</u> Ignition "ON"			
		Continue testing with next test step.	<u>Malfunction:</u> No voltage reading

Trouble-shooting:

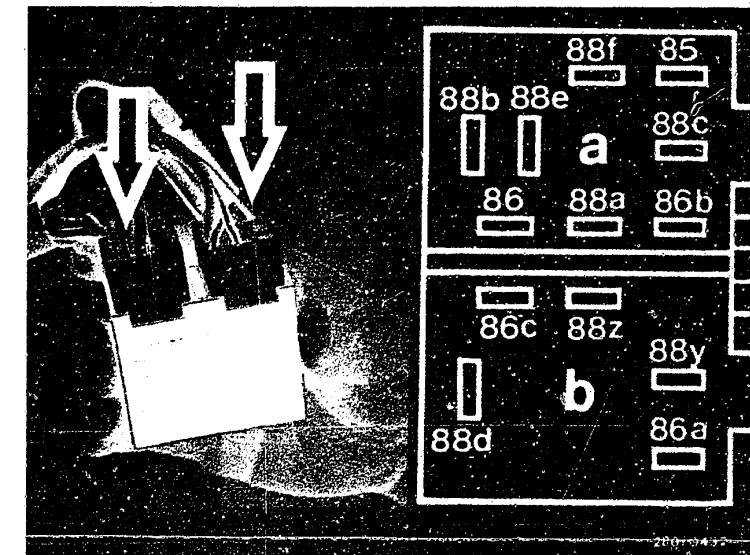
For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

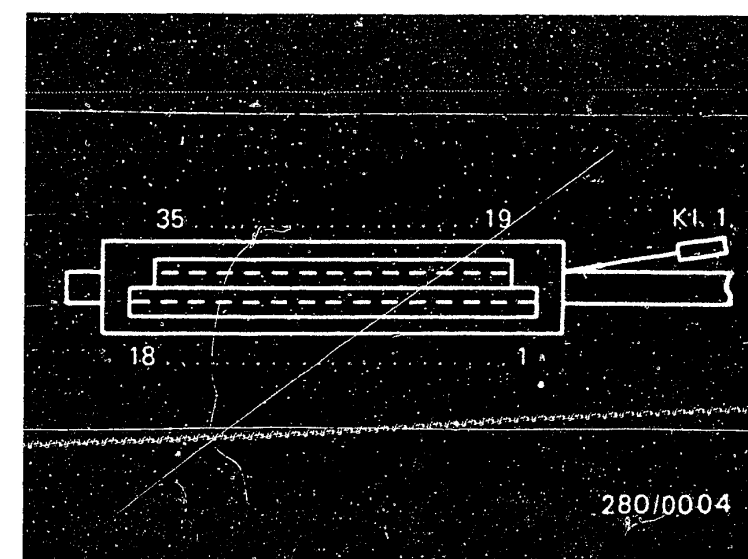
For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug
K1. 1 = Term. 1



Continued on C13/C14

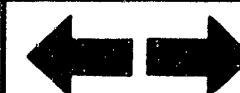
C11

Test chart for universal test adapter
Lancia Gamma i.e.



C12

Test chart for universal test adapter
Lancia Gamma i.e.



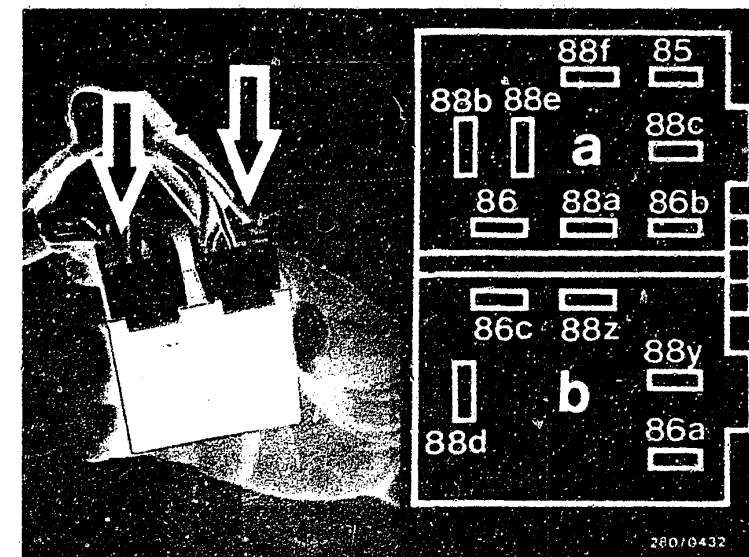
Trouble-shooting (continued)

1. Voltage at relay set term. 88b? If not, replace relay set.
2. Test plug-in connection at 4th solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 41? If not, test lead from injection valve connector to relay set term. 88b.
4. Test lead 14 from injection valve connector to multiple plug term. 14 for continuity.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

- Relay set: In engine compartment on right on inside fender.
- Control unit: Front passenger side in footwell under glove compartment.
- Injection valve: Between intake manifold and engine block (2 on left, 2 on right).



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

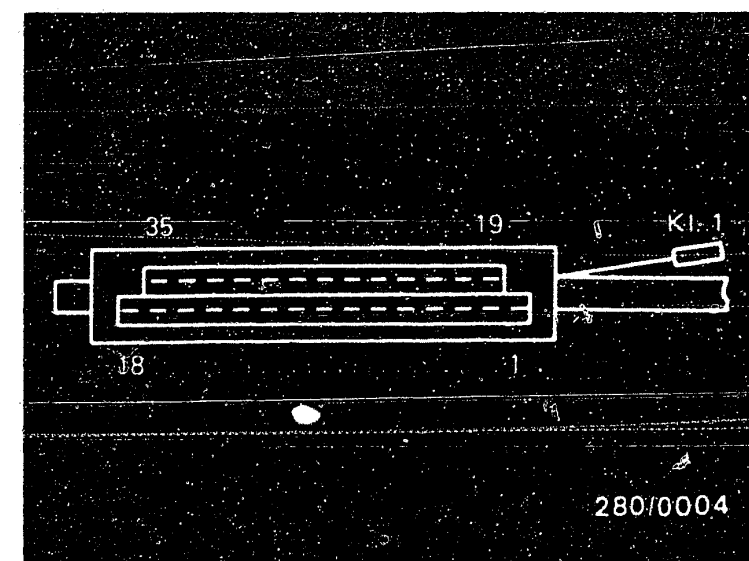
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

K1. 1 = Term. 1



C13

Test chart for universal test adapter

Lancia Gamma i.e.



C14

Test chart for universal test adapter

Lancia Gamma i.e.



Test step 9			
Operation		Reading	Testing
<u>Program switch position "V":</u>	11	Multimeter must indicate 8 ... 15 V.	<u>Component:</u> Pump contact in air-flow sensor, relay set
<u>Program switch position: "Ω"</u>	-		
<u>Measuring equipment:</u> Multimeter		<div><div>yes</div><div>Continue testing with <u>next test step.</u></div></div> <div>no</div>	<u>Operation:</u> Power supply to electric fuel pump
<u>Measuring range:</u> 0 ... 15 V			
<u>Connection:</u> Test sockets red (+) and black (-)			<u>Malfunction:</u> No voltage reading
<u>Operation in vehicle:</u> Ignition "ON", deflect air-flow sensor flap			

Trouble-shooting:

For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C17/C18

C15

Test chart for universal test adapter
Lancia Gamma i.e.



C16

Test chart for universal test adapter
Lancia Gamma i.e.



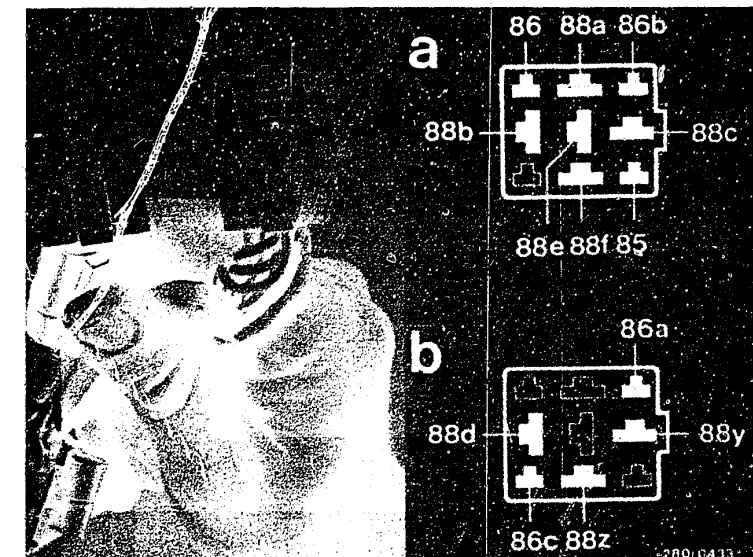
Trouble-shooting (continued)

1. Voltage at air-flow sensor term. 39? If not, remove plug from air-flow sensor and test lead 39.
2. Test pump contact in air-flow sensor (deflect air-flow sensor flap). Test diode in air-flow sensor between term. 6 and term. 36 (positive pole of ohmmeter to term. 6 of air-flow sensor) set value: approx. 0 Ω . With reversed polarity $\infty \Omega$.
3. Test lead 36 between air-flow sensor and relay set.
4. Test lead 20 between control unit and relay set.

Eliminate contact resistances in the plug-in connections.

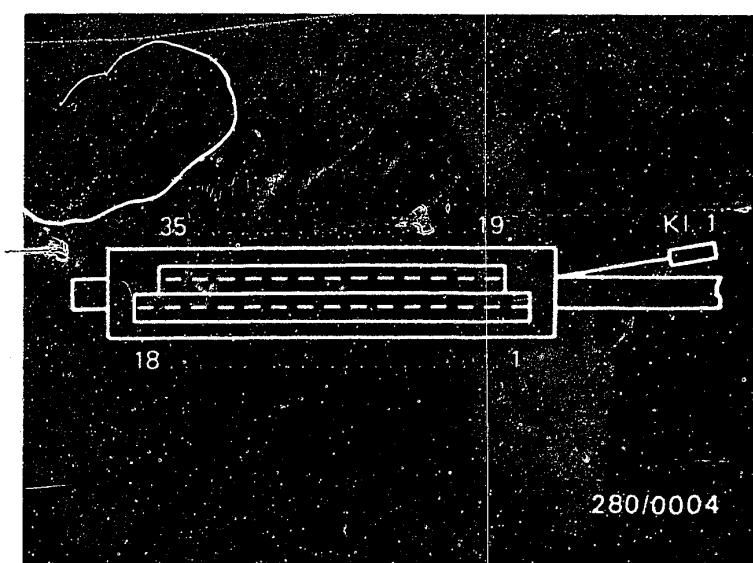
Installation position of components:

- Relay set: In engine compartment on right on inside fender.
- Control unit: Front passenger side in footwell under glove compartment.
- Injection valve: Between intake manifold and engine block (2 on left, 2 on right).



Relay set removed
Top view of plug
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug
Kl. 1 = Term. 1



C17

Test chart for universal test adapter
Lancia Gamma i.e.



C18

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 10			
Operation		Reading	Testing
Program switch position "V":	12	Multimeter must indicate 8 ... 15 V.	Component: Control unit
Program switch position: "Ω"	-		
Measuring equipment: Multimeter (Volt range)			
Measuring range: 0 ... 15 V		<div>yes</div> <div>no</div>	Operation: Triggering of control unit output stage
Connection: Test sockets red (+) and black (-)			Malfunction: No reading
Operation in vehicle: Ignition "ON"			

Trouble-shooting:

For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary use circuit diagram. Set value approx. 0 Ω.

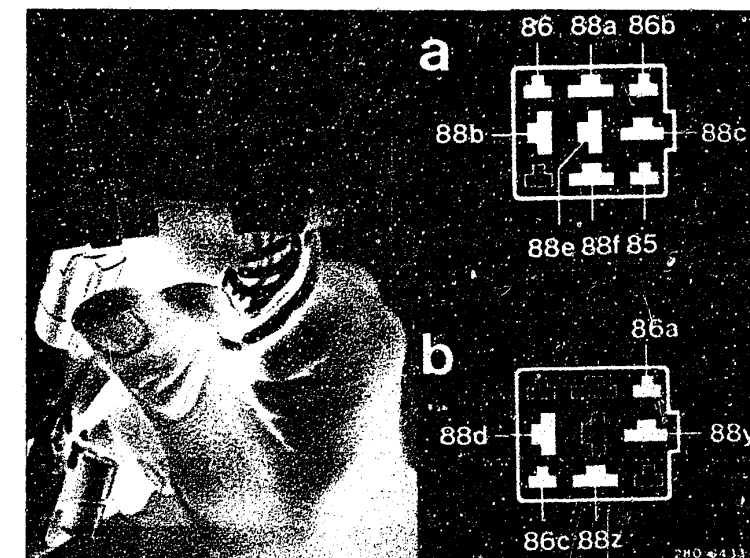
Important! Ignition "OFF" and ensure proper electrical connection when measuring. Test lead from multiple plug term. 29 to relay set term. 88e. If the lead is O.K., but still no reading replace the control unit.

Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: In engine compartment on right on inside fender.

Control unit: Front passenger side in footwell under glove compartment.



Relay set removed

Top view of plug

a = Jetronic wiring harness

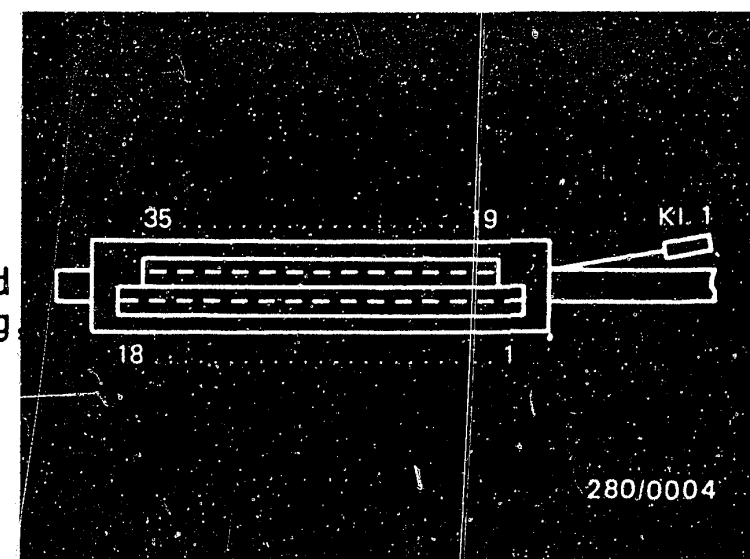
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

Kl. 1 = Term. 1



C19

Test chart for universal test adapter

Lancia Gamma i.e.



C20

Test chart for universal test adapter

Lancia Gamma i.e.



Test step 11		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate	Component: Air-flow sensor (Potentiometer)
Program switch position: "Ω" 6	40...300 Ω 80...600 Ω ①	
Measuring equipment: Multimeter (Ω range)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> yes ↓ Continue testing with next test step. </div> <div style="text-align: center;"> no ↓ </div> </div>	Operation: Resistance between air-flow sensor term. 7 and central ground
Measuring range: x 10 Ω		Malfunction: Resistance outside tolerance
Connection: Test sockets blue		
Operation in vehicle: Deflect air-flow sensor flap		

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

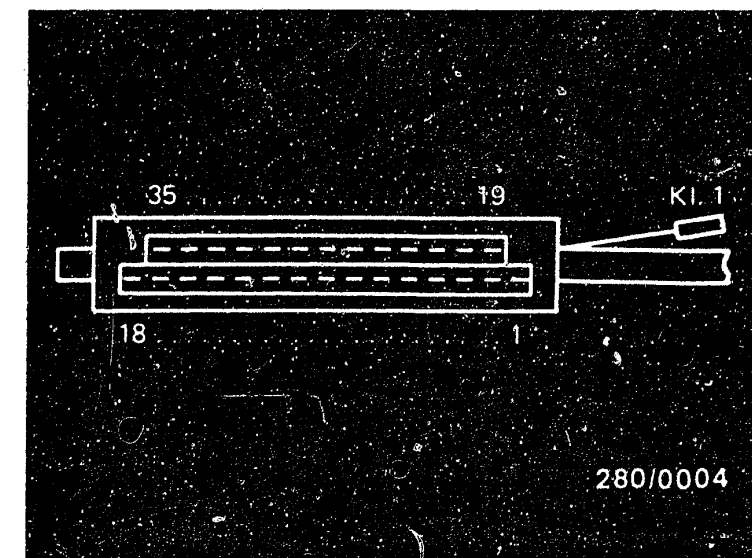
From multiple plug term. 7 to air-flow sensor term. 7

From air-flow sensor term. 6 to multiple plug term. 6

From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.

① as of FD 049



Top view of multiple plug

KL. 1 = Term. 1

Installation position of components:

Control unit: Front passenger side in footwell under glove compartment.

Air-flow sensor: In engine compartment on left between air filter and intake manifold.

Central ground: In engine compartment under throttle-valve switch on transmission housing.



Test step 12		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate 130...260 Ω 260...520 Ω ①	Component: Air-flow sensor
Program switch position: " Ω " 7		Operation: Resistance between air-flow sensor term. 8 and central ground
Measuring equipment: Multimeter (Ω range)		
Measuring equipment: x 10 Ω	<div>yes</div> <div>no</div>	Malfunction: Resistance outside tolerance
Connection: Test sockets blue		
Operation in vehicle: _____		
	Continue testing with next test step.	

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

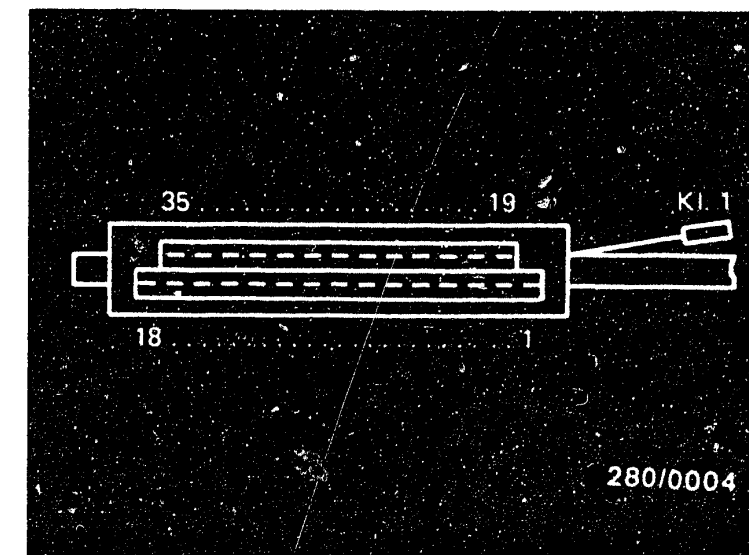
From multiple plug term. 8 to air-flow sensor term. 8

From air-flow sensor term. 6 to multiple plug term. 6

From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.

① As of FD 049



Top view of multiple plug.

KI. 1 = Term. 1

Installation position of components:

Control unit: Front passenger side in footwell under glove compartment.

Air-flow sensor: In engine compartment on left between air filter and intake manifold.

Central ground: In engine compartment under throttle-valve switch on transmission housing.

C23



Test chart for universal test adapter

Lancia Gamma i.e.



C24



Test step 13			
Operation		Reading	Testing
<u>Program switch position "V":</u>		Multimeter must indicate	<u>Component:</u> Air-flow sensor
<u>Program switch position: "Ω"</u>	8	<u>200...400 Ω</u> <u>400...800 Ω</u> ① 	
<u>Measuring equipment:</u> Multimeter (Ω range)			<u>Operation:</u> Resistance between air-flow sensor term. 9 and central ground
<u>Measuring range:</u> x 10 Ω			
<u>Connection:</u> Test sockets blue		<div>yes</div> <div>↓</div> <div>Continue testing with <u>next test step.</u></div>	<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u>		<div>no</div> <div>↓</div>	

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

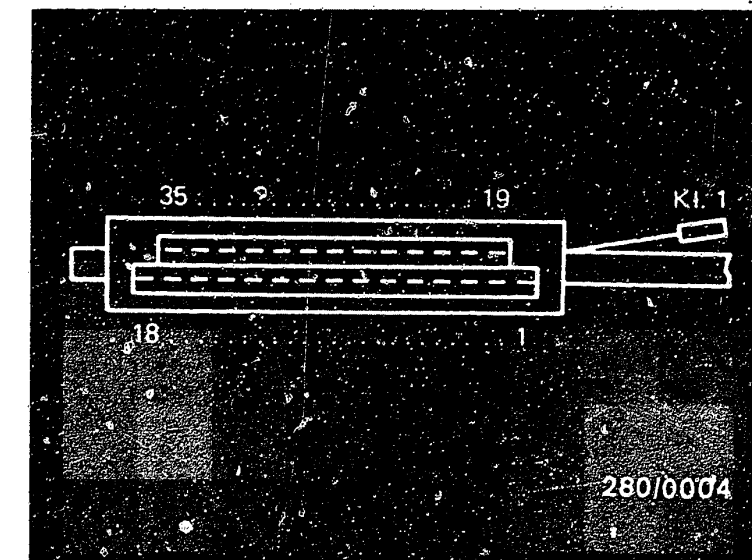
From multiple plug term. 9 to air-flow sensor term. 9

From air-flow sensor term. 6 to multiple plug term. 6

From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.

① As of FD 049



Top view of multiple plug

KI. 1 = Term. 1

Installation position of components:
Control unit: Front passenger side in footwell under glove compartment.

Air-flow sensor: In engine compartment on left between air filter and intake manifold.

Central ground: In engine compartment under throttle-valve switch on transmission housing.

D1

Test chart for universal test adapter
Lancia Gamma i.e.

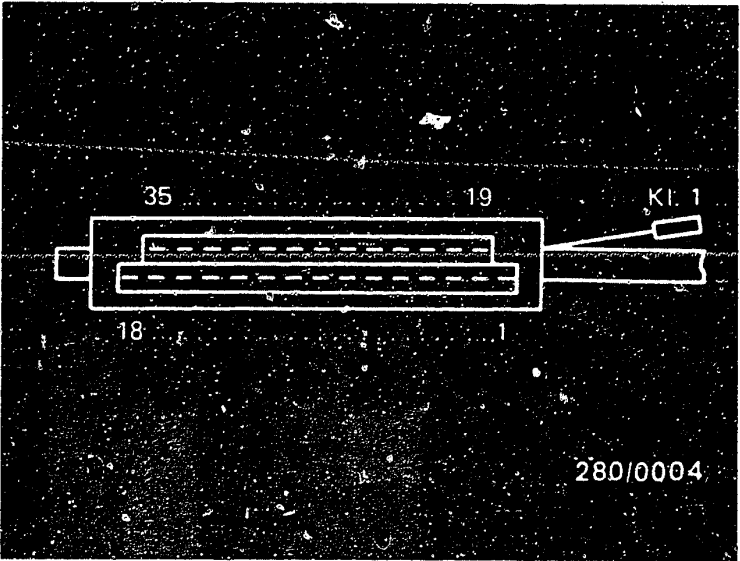


D2

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 14		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate 0...10 Ω.	Component: Throttle-valve switch (Idle contact)
Program switch position: "Ω" 9		
Measuring equipment: Multimeter (Ω range)		Operation: Resistance at throttle-valve switch between term. 2 and term. 18
Measuring range: x 1 Ω	<div>yes</div> <div>↓</div> <div>Continue testing with next test step.</div> <div>no</div> <div>↓</div>	
Connection: Test sockets blue		Malfunction: Resistance outside tolerance
Operation in vehicle: Accelerator in rest position		



Top view of multiple plug
KI. 1 = Term. 1

Trouble-shooting:
For resistance measurements:
 For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.
 Important! Ignition "OFF" and ensure proper electrical connection when measuring.
 From multiple plug term. 2 to throttle-valve switch term. 2
 From throttle-valve switch term. 18 to multiple plug term. 18

Eliminate contact resistances in the plug-in connections.
Adjusting the throttle valve:
 Throttle valve closed? Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.
Adjusting: Throttle valve must be set to just before it sticks with the throttle-valve stop screw. Throttle-valve switch is not adjusted.

Installation position of components:
Throttle-valve switch:
 On right on throttle-valve assembly.
Control unit: Front passenger side in footwell under glove compartment.

Test step 15			
Operation		Reading	Testing
Program switch position "V":	↓	Multimeter must indicate 0...10 Ω.	Component: Throttle-valve switch (Full-load contact)
Program switch position: "Ω"	10		
Measuring equipment: Multimeter (Ω range)			Operation: Resistance at throttle-valve switch between term. 3 and term. 18
Measuring range: x 1 Ω		yes	Malfunction: Resistance outside tolerance
Connection: Test sockets blue		no	
Operation in vehicle: Accelerator in full-load position		Continue testing with next test step.	

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

From multiple plug term. 3 to throttle-valve switch term. 3

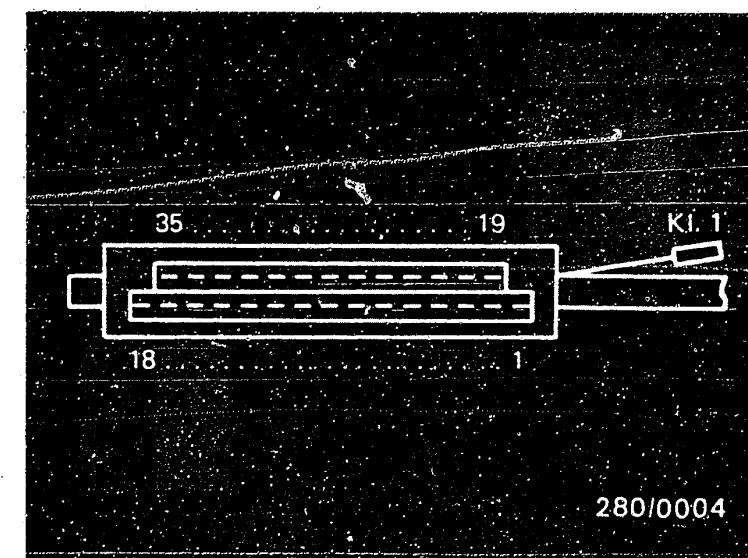
From throttle-valve switch term. 18 to multiple plug term. 18

Eliminate contact resistances in the plug-in connections.

Installation position of components:

Throttle-valve switch: On right on throttle-valve assembly.

Control unit: Front passenger side in footwell under glove compartment.



Top view of multiple plug

KI. 1 = Term. 1

D5

Test chart for universal test adapter

Lancia Gamma i.e.



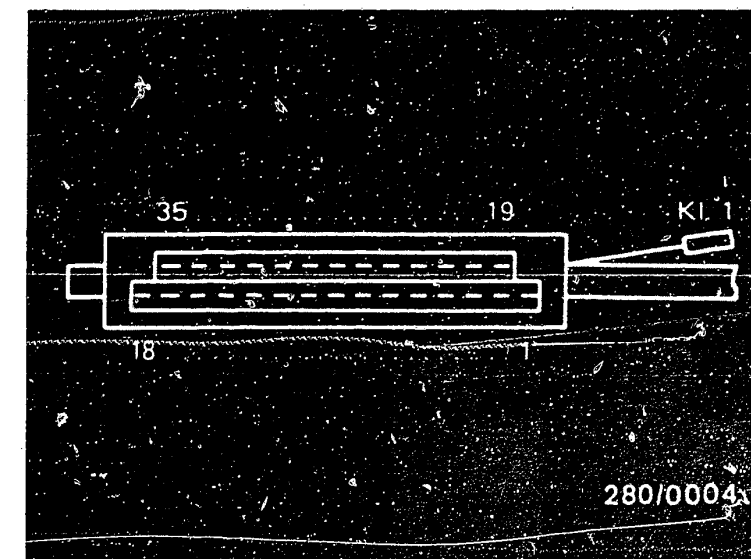
D6

Test chart for universal test adapter

Lancia Gamma i.e.



Test step 16		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate	Component: Temperature sensor I (Intake air)
Program switch position: "Ω" 11	30 Ω...30kΩ (depends on temperature).	
Measuring equipment: Multimeter (Ω range)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> yes ↓ Continue testing with next test step. </div> <div style="text-align: center;"> no ↓ </div> </div>	Operation: Resistance at air-flow sensor between term. 27 and term. 6
Measuring range: x 10 Ω or x 100 Ω		Malfunction: Resistance outside tolerance
Connection: Test sockets blue		
Operation in vehicle:		



Top view of multiple plug
KI. 1 = Term. 1

Trouble-shooting:

Measure resistance directly at temperature sensor I (intake air) in air-flow sensor.
At ambient temperature (approx. + 15 ... + 30°C): 1.45...3.3 kΩ
With engine at normal operating temperature (approx. + 80°C): 280...360 Ω

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important!

Ignition "OFF" and ensure proper electrical contact when measuring.
From multiple plug term. 27 to air-flow sensor term. 27
From air-flow sensor term. 6 to multiple plug term. 6
From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.

Installation position of components:
Control unit: Front passenger side in footwell under glove compartment.

Air-flow sensor: In engine compartment on left between air filter and intake manifold.
Central ground: In engine compartment under throttle-valve switch on transmission housing.

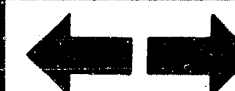
D7

Test chart for universal test adapter
Lancia Gamma i.e.

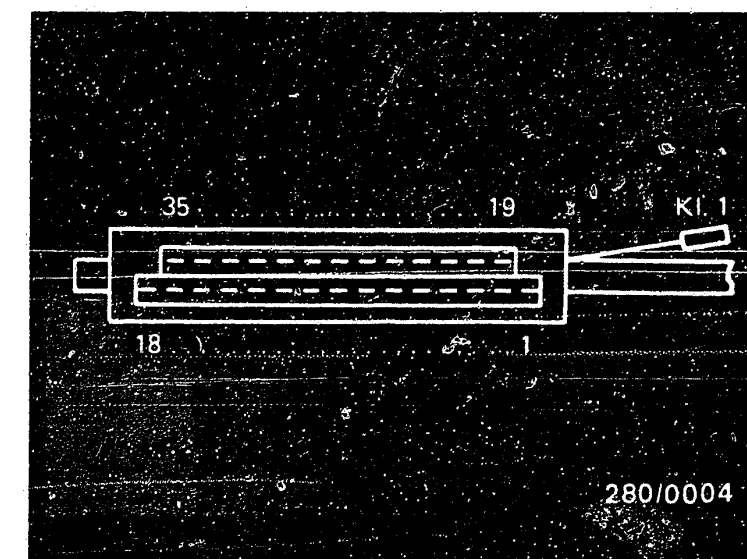


D8

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 17		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate	Component: Temperature sensor II (Engine)
Program switch position: "Ω" 12	30 Ω...30kΩ (depends on temperature).	Operation: Resistance between control unit term. 10 and central ground
Measuring equipment: Multimeter (Ω range)	<div>yes</div> <div>↓</div> <div>Continue testing with next test step.</div>	<div>no</div> <div>↓</div> <div>Malfunction: Resistance outside tolerance</div>
Measuring range: x 10 Ω or x 100 Ω		
Connection: Test sockets blue		
Operation in vehicle: _____		



Top view of multiple plug
Kl. 1 = Term. 1

Trouble-shooting:

Measure resistance directly at temperature sensor II (engine) (white plug):

At ambient temperature (approx. + 15...+ 30°C): 1.3...3.6 kΩ

With engine at normal operating temperature (approx. + 80°C): 250...390 Ω

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 13 to temperature sensor II (engine) term. 13.

Lead 49 from temperature sensor II to central ground.

Eliminate contact resistances in the plug-in connections.

Installation position of components:

Control unit: Front passenger side in footwell under glove compartment.

Temperature sensor II:

In engine compartment in coolant system at front on engine block (white plug).

Central ground: In engine compartment under throttle-valve switch on transmission housing.

D9

Test chart for universal test adapter
Lancia Gamma i.e.

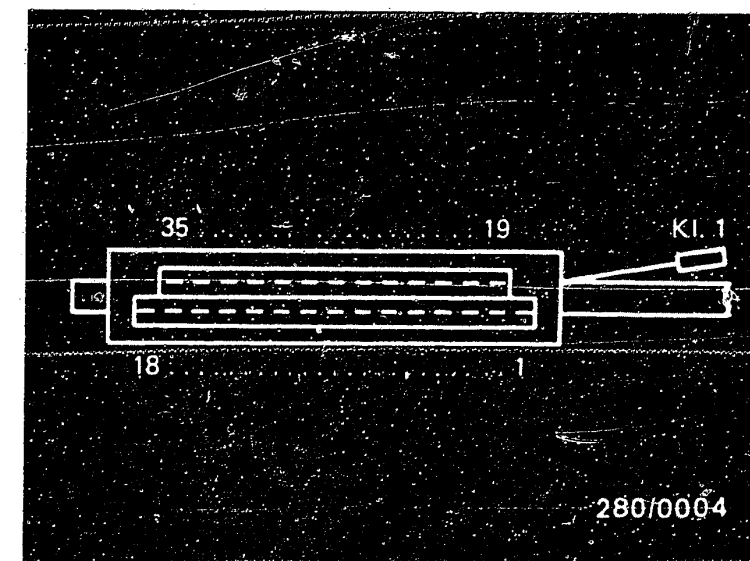


D10

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 18		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate 0...10 Ω.	Component: Ground connection of output stage
Program switch position: "Ω" 13		
Measuring equipment: Multimeter (Ω range)	<div>yes</div> <div>no</div>	Operation: Ground connection of control unit Malfunction: Resistance outside tolerance
Measuring range: x 1 Ω		
Connection: Test sockets blue		
Operation in vehicle: _____		



Top view of multiple plug
K1. 1 = Term. 1

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 16 to central ground.

From multiple plug term. 5 to central ground.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Control unit: Front passenger side in footwell under glove compartment.

Central ground: In engine compartment under throttle-valve switch on transmission housing.

D11


Test chart for universal test adapter
Lancia Gamma i.e.

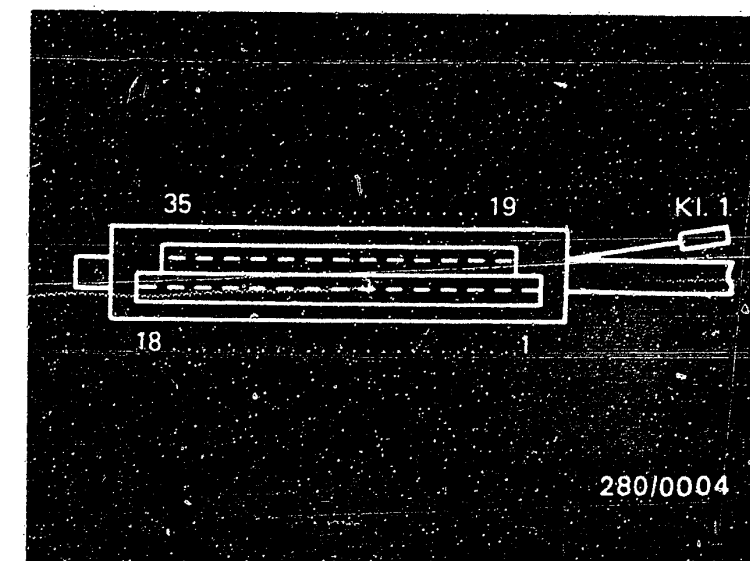


D12

Test chart for universal test adapter
Lancia Gamma i.e.



Test step 19			
Operation		Reading	Testing
<u>Program switch position "V":</u>		Multimeter must indicate	<u>Component:</u> Ground connection of output stage
<u>Program switch position: "Ω"</u>	14	<u>0...10 Ω.</u>	
<u>Measuring equipment:</u> Multimeter (Ω range)			<u>Operation:</u> Ground connection of control unit
<u>Measuring range:</u> x 1 Ω		yes	
<u>Connection:</u> Test sockets blue		no	
<u>Operation in vehicle:</u>		Continue testing with next test step.	<u>Malfunction:</u> Resistance outside tolerance



Top view of multiple plug
K1. 1 = Term. 1

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 17 to central ground.

From multiple plug term. 5 to central ground.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Control unit: Front passenger side in footwell under glove compartment.

Central ground: In engine compartment under throttle-valve switch on transmission housing.

D13

Test chart for universal test adapter
Lancia Gamma i.e.



D14

Test chart for universal test adapter
Lancia Gamma i.e.



Testing with the universal test adapter is now completed.

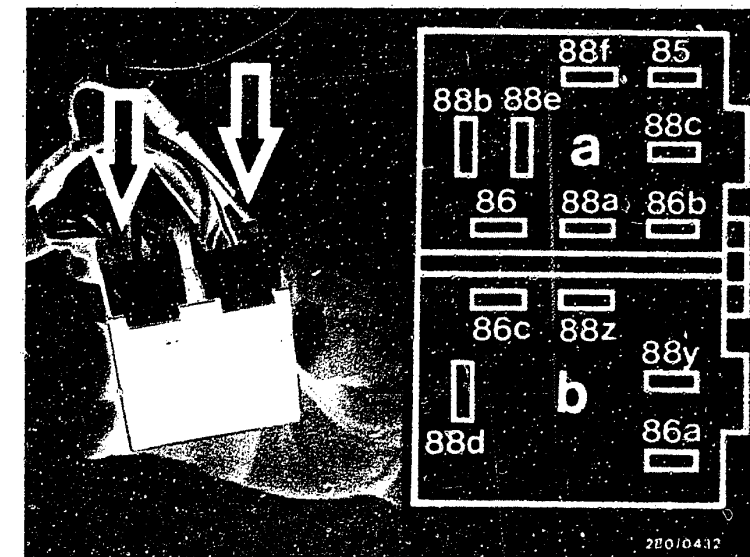
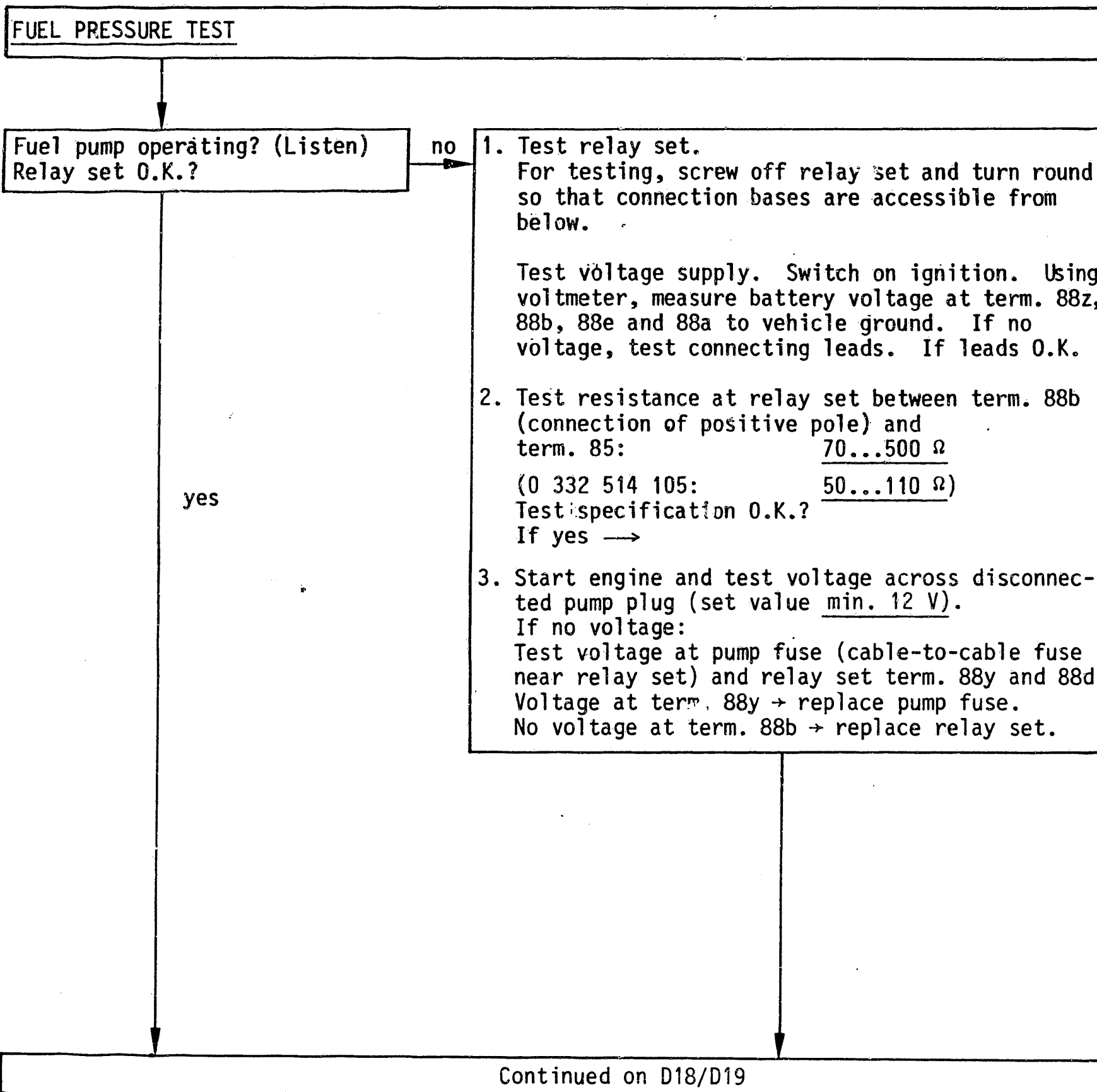
The fuel pressure test must now be performed.
If a fault is found during a test, the test must be repeated after the fault has been eliminated.

The fuel pressure test is described on Coordinates D16 ... E 2.

D15

Test chart for universal test adapter
Lancia Gamma i.e.

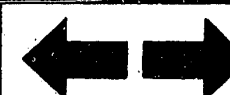
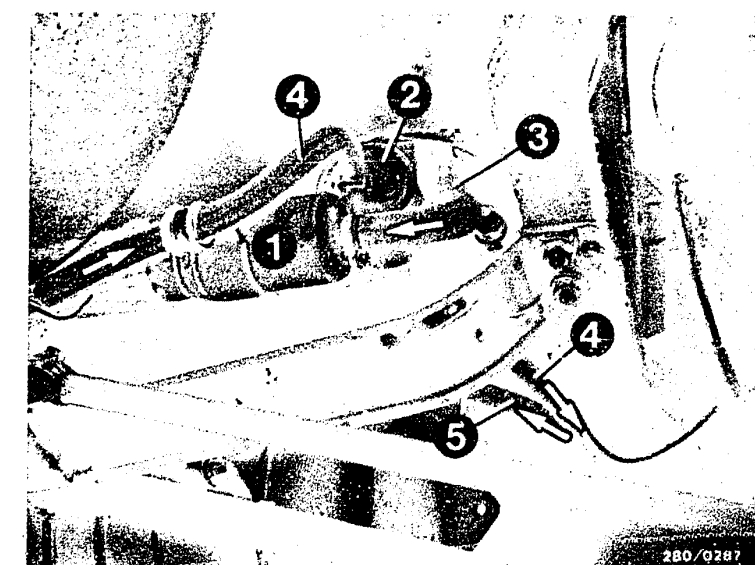


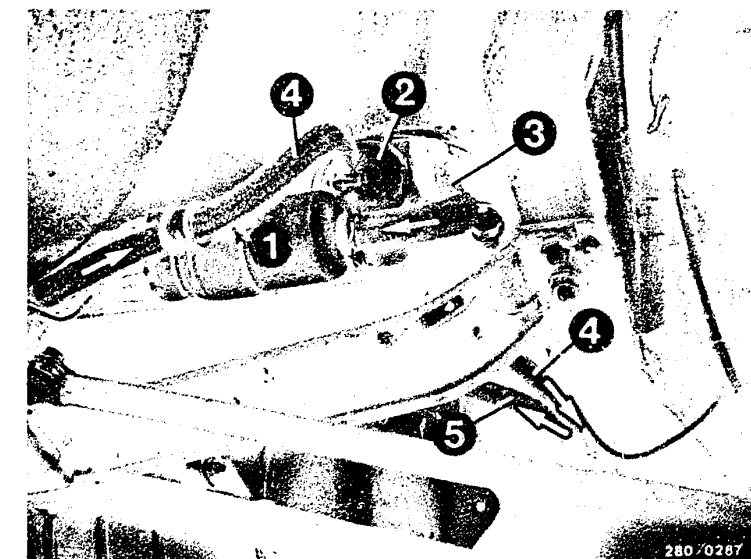
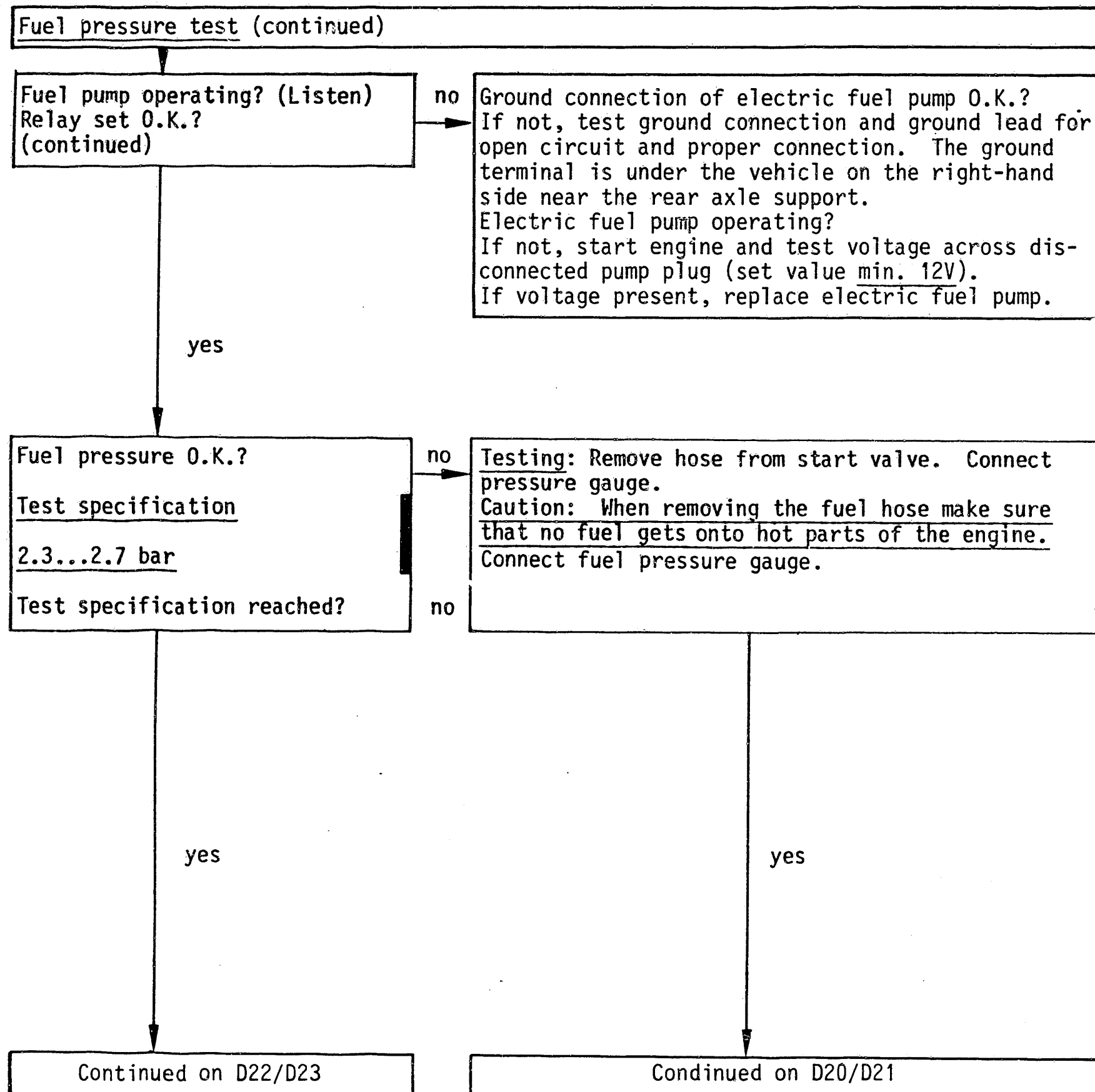


Measure voltage on back of plug.

a = Jetronic wiring harness
b = Vehicle wiring harness
(no term. 88f on relay set 0 332 514 105)

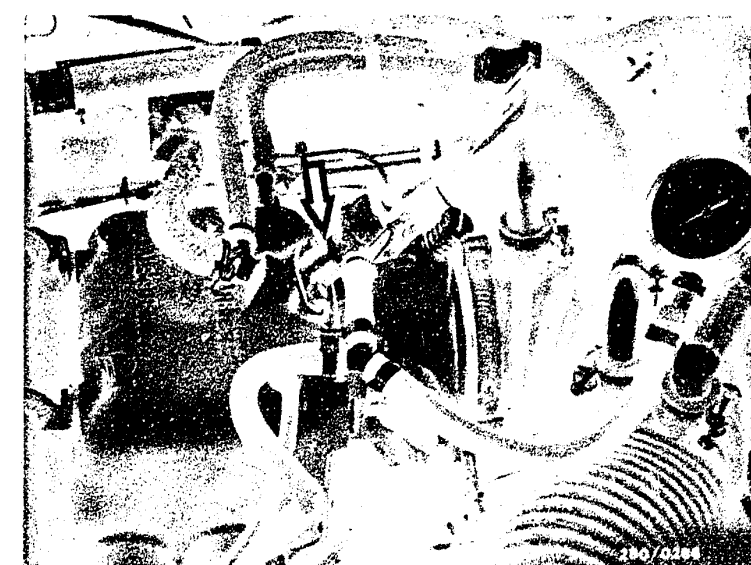
1 = Fuel pump





- 1 = Electric fuel pump
- 2 = Fuel filter
- 3 = Fuel intake line
- 4 = Fuel delivery line
- 5 = Fuel pump plug
- Arrow = Direction of fuel flow

Arrow = Start valve



D18

Fuel pressure test
Lancia Gamma i.e.



D19

Fuel pressure test
Lancia Gamma i.e.



Fuel pressure test (continued)

Testing the fuel pressure

Connect the connections of the pressure testers into the fuel delivery line on the start valve. If using pressure tester KDJE-P 100, close the hollow screw. Plug the end of the hose onto the start valve, and plug the Y-piece onto the hose to the fuel-distribution pipe.

Make sure there are no leaks.

Remove the hose between air filter and air-flow sensor. Switch on ignition. Slightly deflect air-flow sensor flap. (Pump contact must close).

Fuel pump must operate.

Fuel pump pressure

2.3...2.7 bar

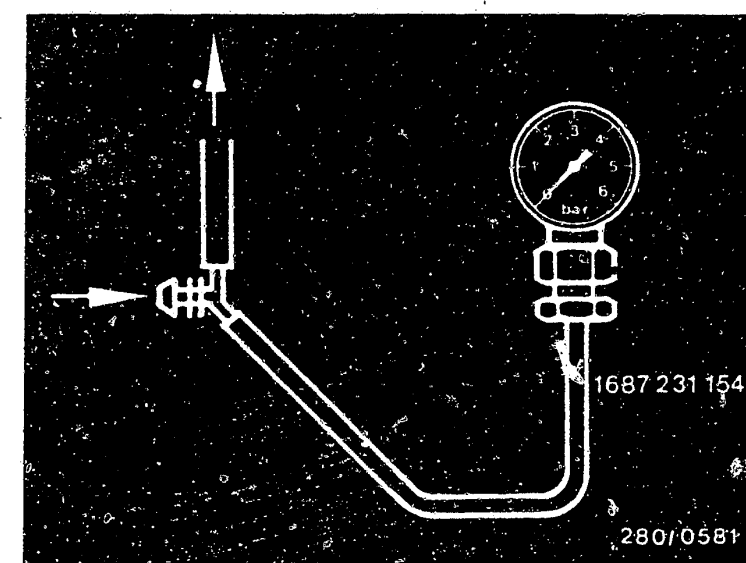
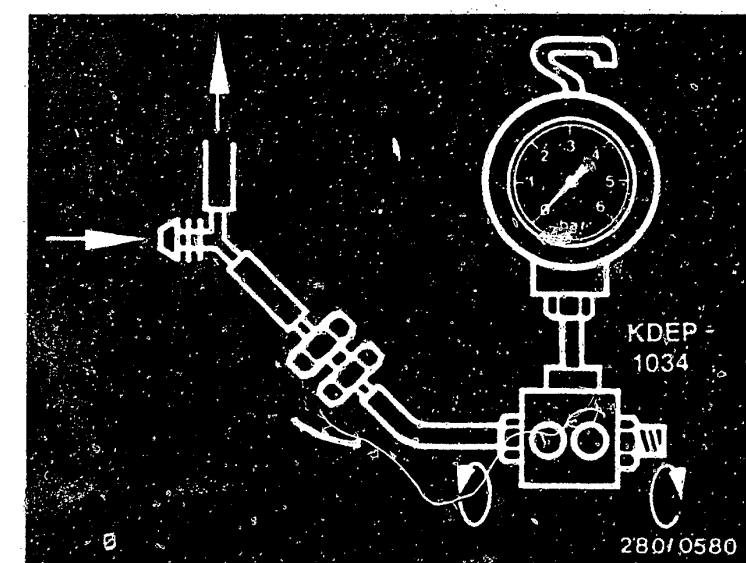
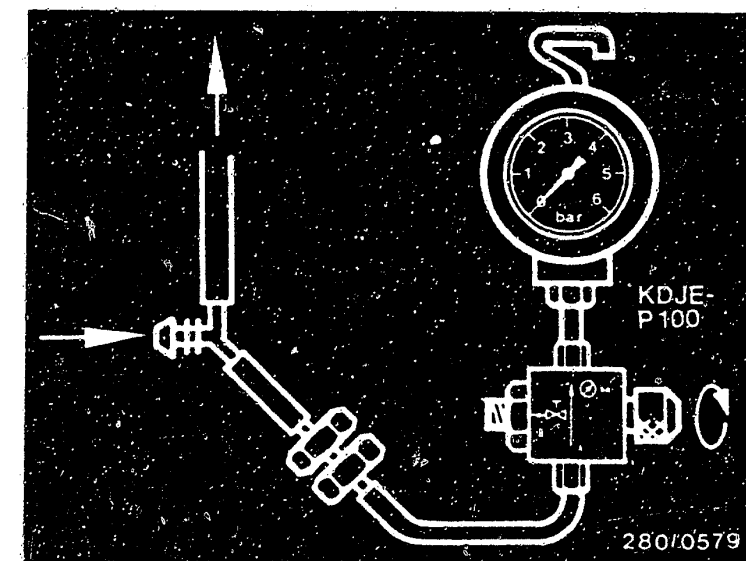
Let engine idle →

Fuel pump pressure approx. 2.0 bar

yes

yes

Continued on D22/D23



D20

Fuel pressure test
Lancia Gamma i.e.



D21

Fuel pressure test
Lancia Gamma i.e.



Fuel pressure test (continued)

Fuel pressure O.K.?

Test specification

2.3...2.7 bar

Pressure regulator O.K.?
Test specification reached?

no

Testing the pressure regulator

Remove hose between air filter and air-flow sensor. Switch on ignition. Slightly deflect air-flow sensor flap (pump contact must close). Electric fuel pump must operate.

Fuel pump pressure

2.3...2.7 bar

Fuel pressure of 2.3 bar not reached:

1. Slowly pinch off fuel return line: (caution: do not load pressure gauge above 6 bar).
Pressure rises above 4 bar → replace pressure regulator.
Pressure remains below 4 bar → replace electric fuel pump.
2. Check fuel delivery line and fuel filter for throughflow.
3. Strainer in tank clogged.
4. Corrosion in tank.

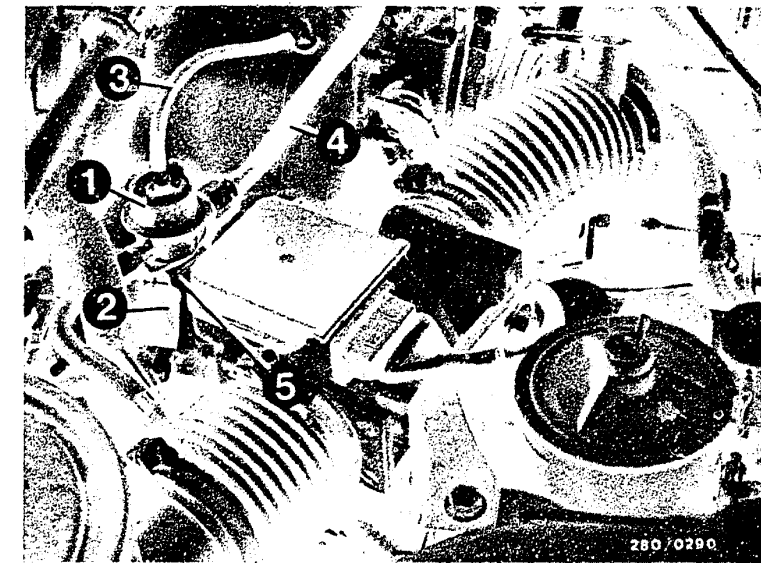
Fuel pressure of 2.7 bar exceeded:

1. Fuel return line clogged or pinched.
2. Replace pressure regulator.

After testing is completed, refit the hose between air filter and air-flow sensor.

yes

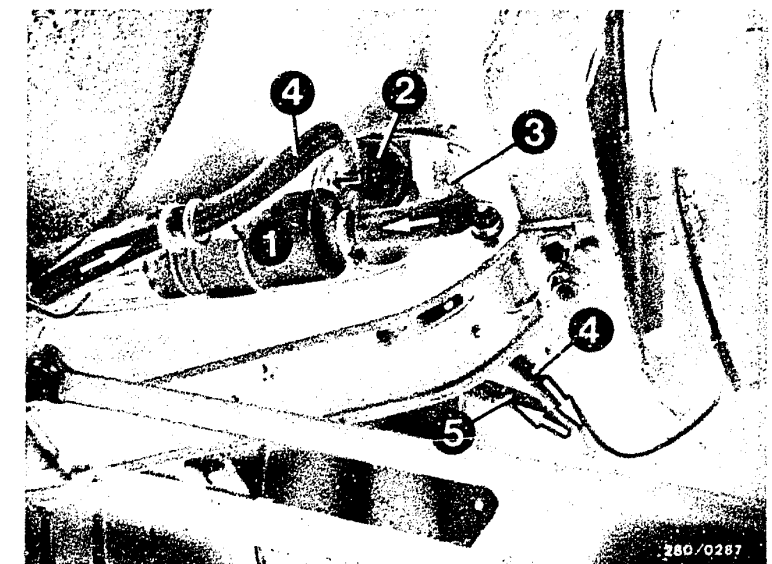
Continued on E1/E2



- 1 = Pressure regulator
- 2 = Fuel return line
- 3 = Air hose to intake manifold
- 4 = Fuel delivery line
- 5 = Support bracket

- 1 = Fuel pump
- 2 = Fuel filter
- 3 = Fuel intake line
- 4 = Fuel delivery line
- 5 = Fuel return line

Arrow = Direction of fuel flow



D22

Fuel pressure test
Lancia Gamma i.e.



D23

Fuel pressure test
Lancia Gamma i.e.



Fuel pressure test (continued)

Does fuel pressure remain constant after the engine has started?

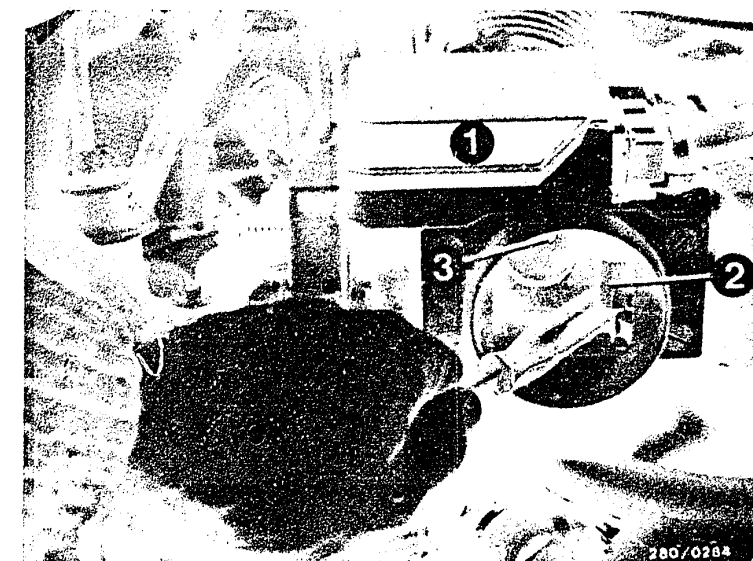
no

Test fuel pump contact in air-flow sensor:
Remove hose between air filter and air-flow sensor and disconnect plug. Connect ohmmeter to term. 36 and term. 39 of air-flow sensor. Slightly open air-flow sensor flap by hand. Reading must change from $\infty \Omega$ to 0Ω . If not, replace air-flow sensor. Refit hose between air filter and air-flow sensor. Make sure there are no leaks.

yes

The fuel pressure test is now completed.
If the fault has not been found or if you require further information and instructions on how to remedy the fault, continue with the trouble-shooting program of your choice.

Detailed trouble-shooting → see B 3
Direct trouble-shooting → see B 5



- 1 = Air-flow sensor
- 2 = Stopper
- 3 = Temperature sensor I

E1

Fuel pressure test
Lancia Gamma i.e.



E2

Fuel pressure test
Lancia Gamma i.e.



STARTING MOTOR OPERATES, ENGINE FAILS TO START OR STARTS ONLY WITH GREAT DIFFICULTY

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

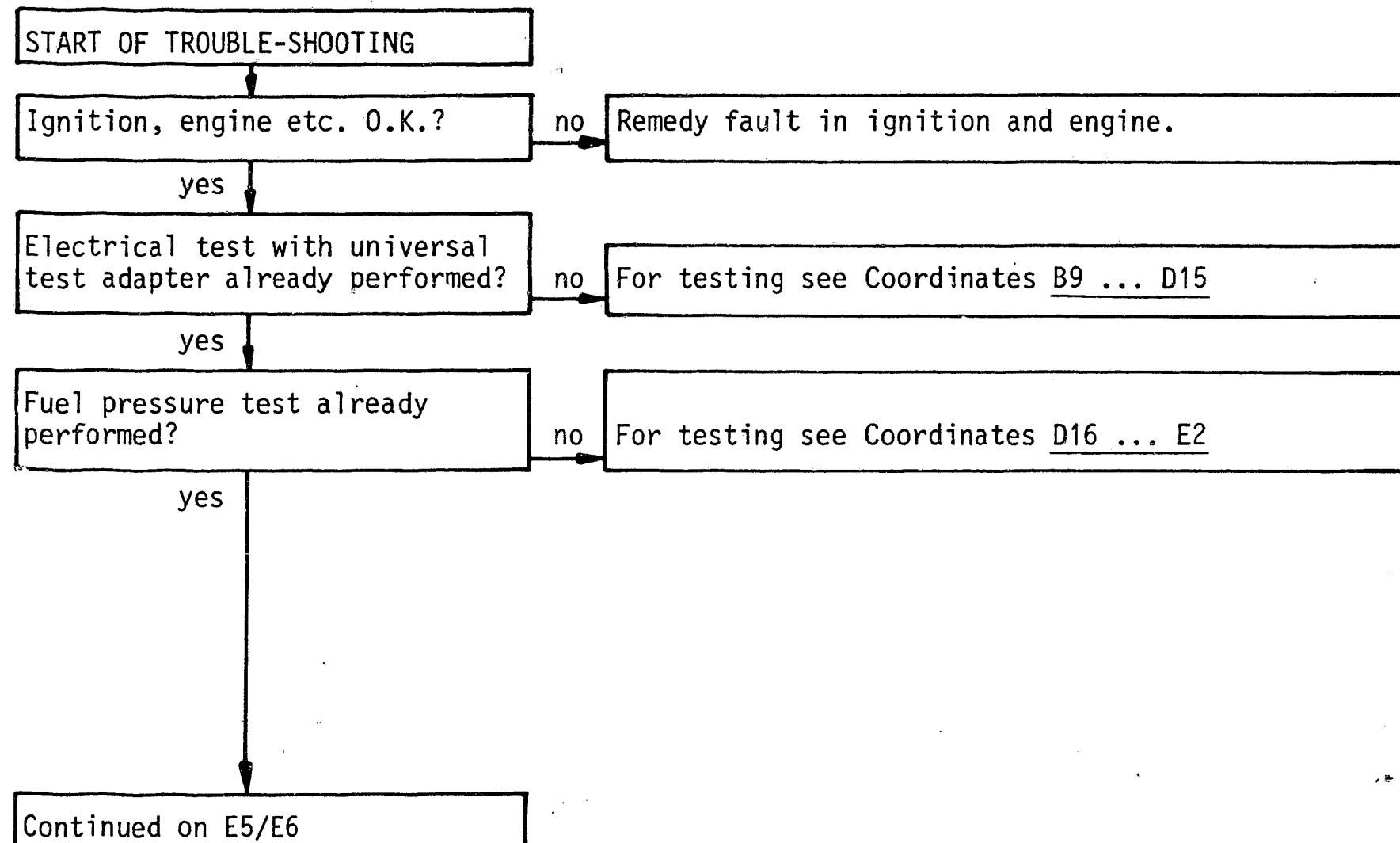
The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



E3

Engine fails to start
Lancia Gamma i.e.



E4

Engine fails to start
Lancia Gamma i.e.



Starting motor operates, engine fails to start or starts only with great difficulty
(continued)

Start valve O.K.?

no

Functional test:

Test power supply to start valve when starting. To do this, remove plug from start valve and connect voltmeter to term. 46 and term. 45/term 47 of start valve plug.

1. Coolant at ambient temperature + 15°C...+30°C:
Voltage reading min. 6 V.
2. Coolant with engine at normal op. temp. as of +40°C:
Voltage reading approx. 0 V

Test the following leads for continuity with ohmmeter (set value approx. 0Ω):

Lead from start valve term. 46 to thermo-time switch term. W. Lead from start valve term. 45 to thermo-time switch term. G. Lead from start valve term. 47 to relay set term. 86. Test ground connection of thermo-time switch.

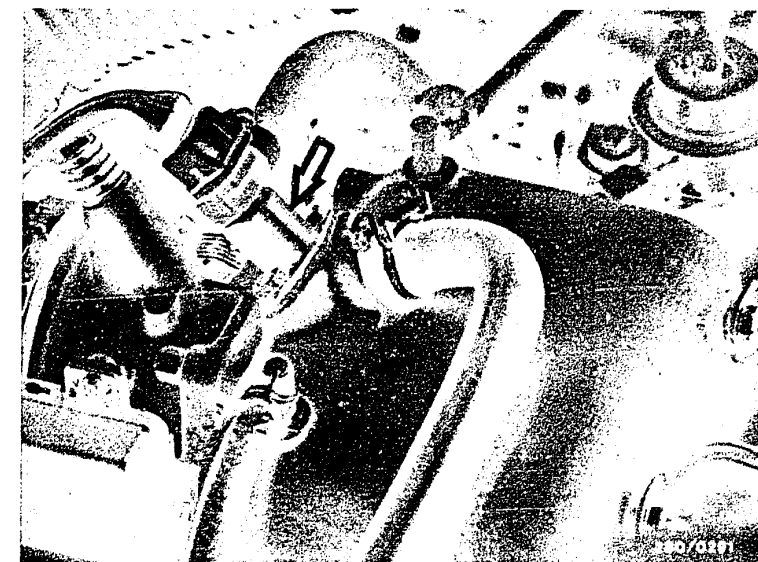
Electrical test of start valve:

Connect ohmmeter to start valve (remove plug):
Set value approx. 4 Ω.

yes

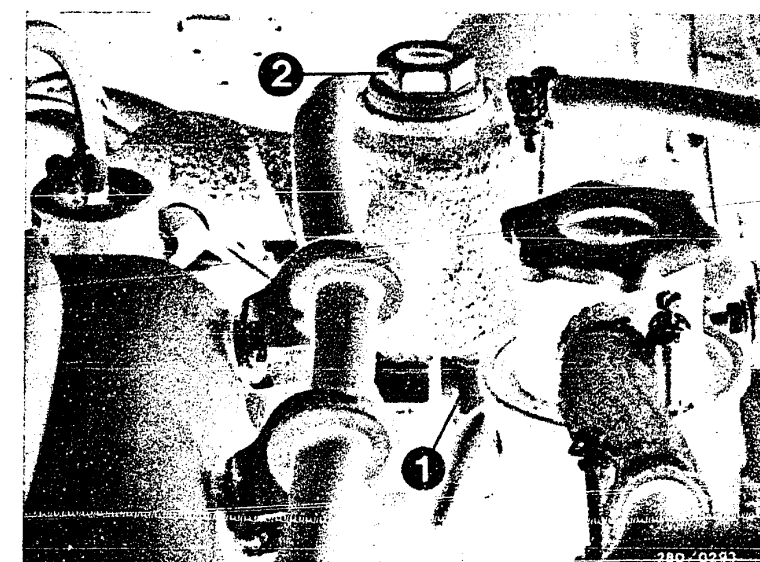
Continued on E9/E10

Continued on E7/E8



Arrow = Start valve

- 1 = Thermo-time switch
2 = Coolant bleeder screw



E5

Engine fails to start
Lancia Gamma i.e.



E6

Engine fails to start
Lancia Gamma i.e.



Starting motor operates, engine fails to start or starts only with great difficulty
(continued)

Mechanical test of start valve:

Remove start valve from intake manifold and hold in a container. (Caution! Fire hazard!). When starting at an ambient temperature below +30° C the start valve must squirt (max. 8 sec.). With the engine at normal operating temperature above +40°C the start valve must not squirt. With the ignition switched on and the pressure built up the start valve must likewise not squirt. Carry out squirt test for above +40°C as follows: Remove plug from thermo-time switch and ground term. W.

Testing the start valve for leaks:

1. When installed: Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.
2. When removed: Remove start valve (Caution! Fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition on, and deflect air-flow sensor flap). Test specification: within one minute max. 1 drop may form at the mouth of the valve. Caution! After testing is completed, refit the hose between air filter and air-flow sensor.

yes

Continued on E9/E10

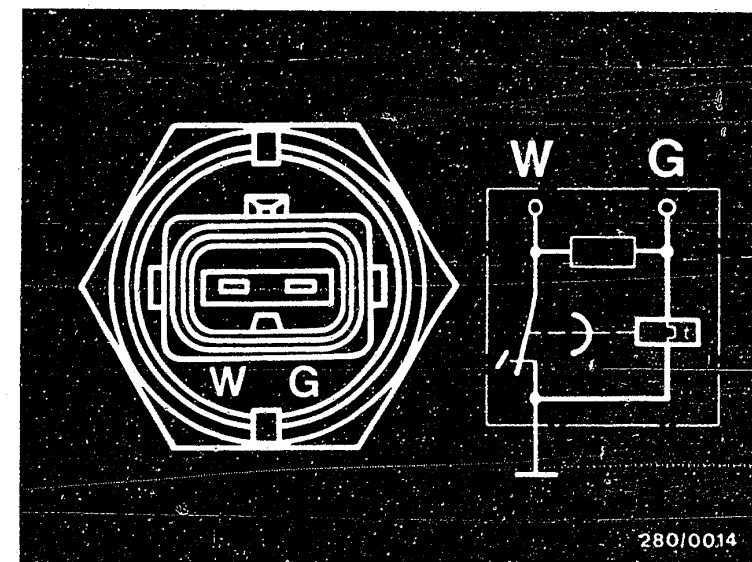
E7

Engine fails to start
Lancia Gamma i.e.

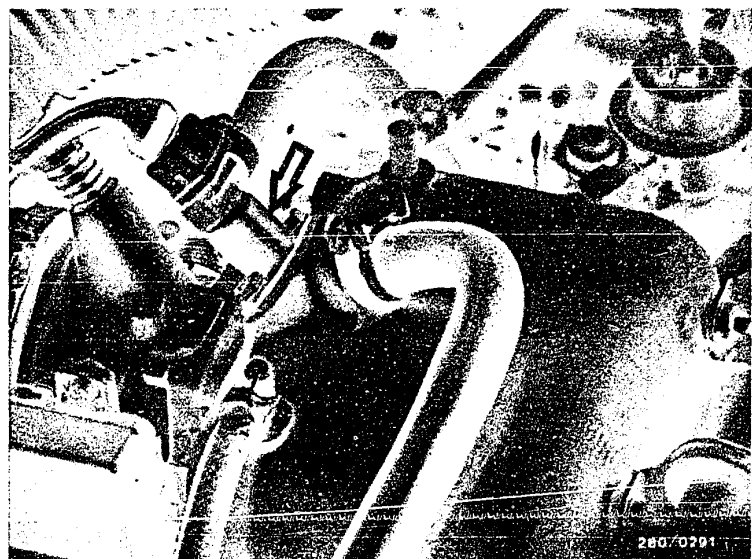


E8

Engine fails to start
Lancia Gamma i.e.



Thermo-time switch



Arrow = Start valve

Starting motor operates, engine fails to start or starts only with great difficulty

Thermo-time switch O.K.?

no

Electrical test

Test the thermo-time switch as follows:
Disconnect plug and make direct resistance
measurement at thermo-time switch using ohmmeter:

Measured between term. "G" and ground
Ambient temperature (below +30°C):

25 ... 40 Ω

Engine at operating temperature (approx. +40°C):

50 ... 80 Ω

Measured between term. "W" and ground
Ambient temperature (below +30°C):

0 Ω

Engine at operating temperature (approx. +40°C):

100 ... 160 Ω

Measured between term. "G" and "W"
Ambient temperature (below +30°C):

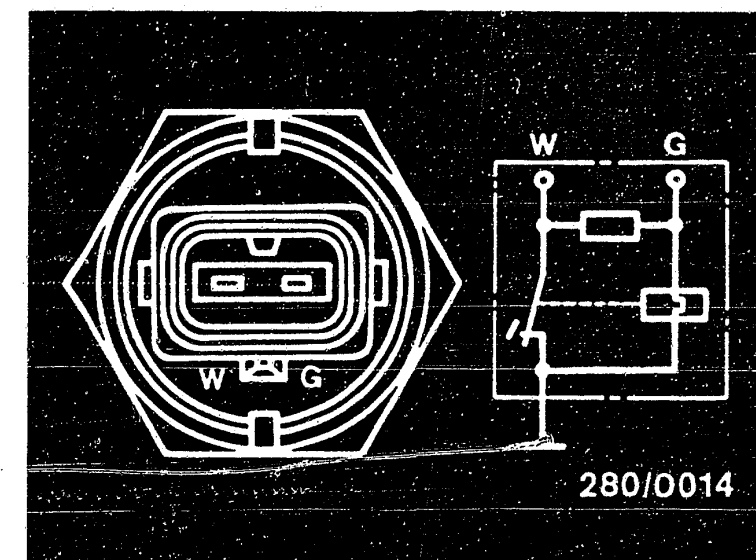
25 ... 40 Ω

Engine at operating temperature (approx. +40°C):

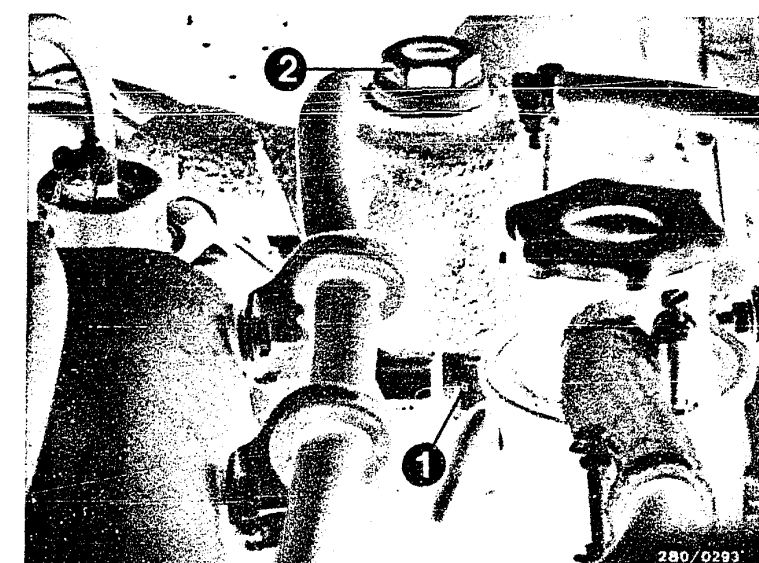
50 ... 80 Ω

yes

Continued on E11/E12



- 1 = Thermo-time switch (brown plug)
- 2 = Coolant bleeder screw



E9

Engine fails to start
Lancia Gamma i.e.



E10

Engine fails to start
Lancia Gamma i.e.



Starting motor operates, engine fails to start or starts only with great difficulty
(continued)

Auxiliary-air device tested?
(mechanically O.K.?)

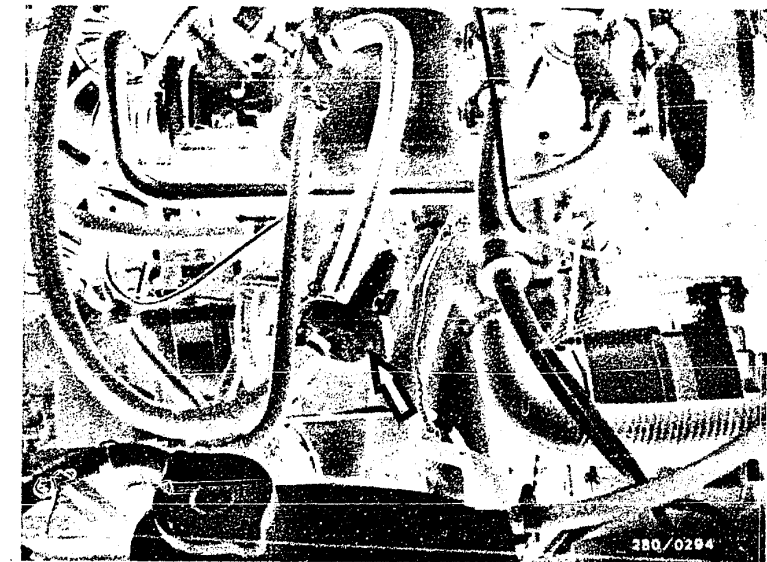
no

Testing:

1. Visual examination of auxiliary-air device.
When cold, the device must be opened; when the engine is warm, it must be closed. If not, replace auxiliary-air device. (Remove hoses and look down, possibly using a small mirror).
2. Functional test of auxiliary-air device:
With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

yes

Continued on E13/E14



Arrow = Auxiliary-air device

E11

Engine fails to start
Lancia Gamma i.e.



E12

Engine fails to start
Lancia Gamma i.e.



Starter motor operates, engine fails to start or starts only with great difficulty
(continued)

Temperature sensors tested?

no

Testing:

Temperature sensor I measures the intake air temperature and is located in the air duct of the air-flow sensor. Measure the following values between term. 27 and term. 6 of air-flow sensor:

1. At ambient temperature
(approx. $+15^{\circ}\text{C} \dots +30^{\circ}\text{C}$):
 $1.45 \dots 3.3 \text{ k} \Omega$
2. With engine at normal op. temp.
(approx. $+80^{\circ}\text{C}$):
 $280 \dots 360 \Omega$

Make direct resistance measurement at temperature sensor II (engine) using ohmmeter. Resistance measurement at term. 13 and term. 49 (ground):

1. At ambient temperature
(approx. $+15^{\circ}\text{C} \dots +30^{\circ}\text{C}$):
 $1.30 \dots 3.6 \text{ k} \Omega$
2. With engine at normal op. temp.
(approx. $+80^{\circ}\text{C}$):
 $250 \dots 390 \Omega$

If incorrect, check for open circuit or short circuit in the following leads using ohmmeter:

Temperature sensor I:

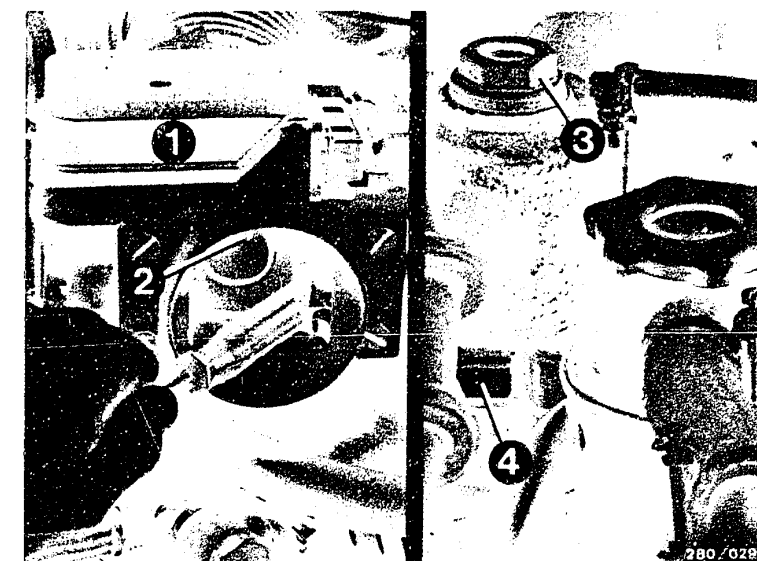
- From multiple plug term. 27 to air-flow sensor term. 27.
- From air-flow sensor term. 6 to multiple plug term. 6

Temperature sensor II:

- From multiple plug term. 13 to temperature sensor II term. 13.
- From temperature sensor II term. 49 to central ground (lead 49). Check all contacts in the plug-in connections.

yes

Continued on E15/E16



- 1 = Air-flow sensor
- 2 = Temperature sensor I
- 3 = Coolant bleeder screw
- 4 = Temperature sensor II
(white plug)

E13

Engine fails to start
Lancia Gamma i.e.



E14

Engine fails to start
Lancia Gamma i.e.



Starter motor operates, engine fails to start or starts only with great difficulty
(continued)

Air-flow sensor O.K.?

no

The air-flow sensor is secured on a bracket by 3 screws.

Testing

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor.

Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

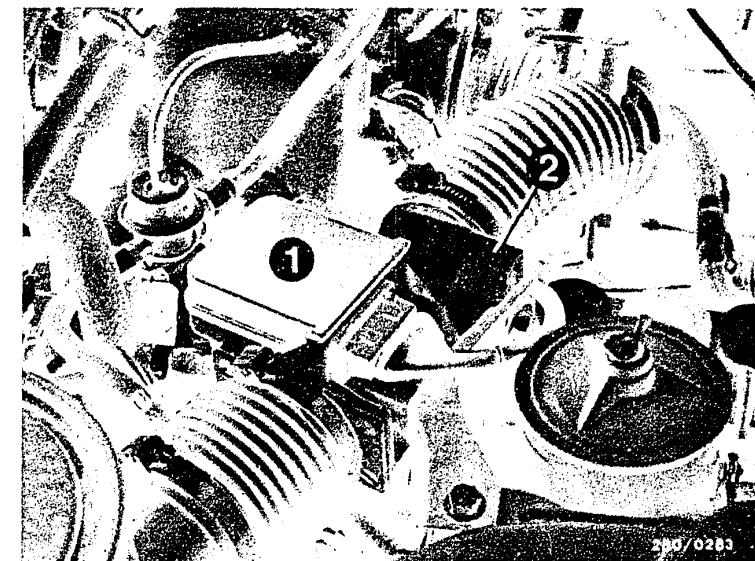
Test specification: $\underline{100...500\ \Omega}$
as of FD 049 $\underline{200...1000\ \Omega}$

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.

yes

Continued on E17/E18



- 1 = Air-flow sensor
2 = Bypass screw (mixture adjustment)
Turning in a clockwise direction
= richer mixture

E15

Engine fails to start
Lancia Gamma i.e.



E16

Engine fails to start
Lancia Gamma i.e.



Starter motor operates, engine fails to start or starts only with great difficulty
(continued)

Are all hose lines and electric leads securely connected? Visual examination.
Is the air-intake system leak-tight?

no

Check whether hoses of air-intake system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by re-tightening the connecting screws.

Leak test:

Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose contacts.

yes

Testing completed for customer complaint

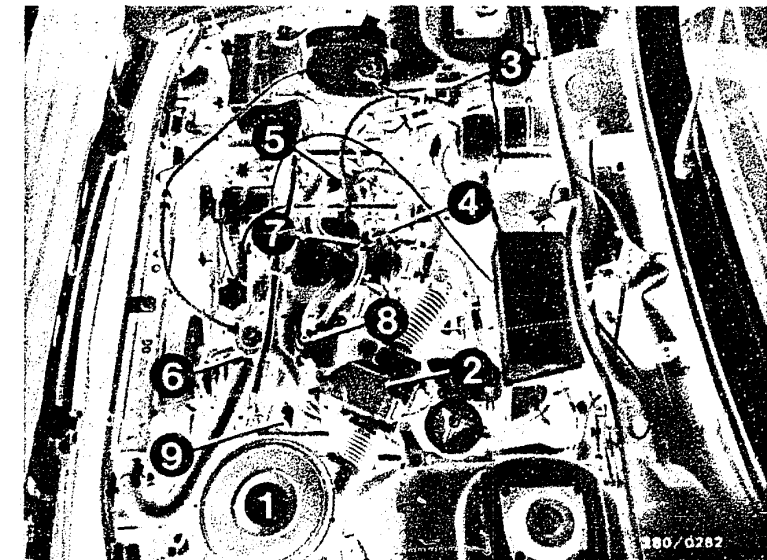
"Starting motor operates, engine fails to start"

Customer complaint remedied?

no

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (compression, valve setting, valve timing, worn camshaft).



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Relay set
- 4 = Throttle-valve switch
- 5 = Auxiliary-air device (black plug)
- 6 = Temperature sensor II (white plug)
Thermo-time switch (brown plug)
- 7 = Start valve
- 8 = Pressure regulator
- 9 = Injection valve

E17

Engine fails to start
Lancia Gamma i.e.



E18

Engine fails to start
Lancia Gamma i.e.



ENGINE STARTS BUT THEN DIES

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

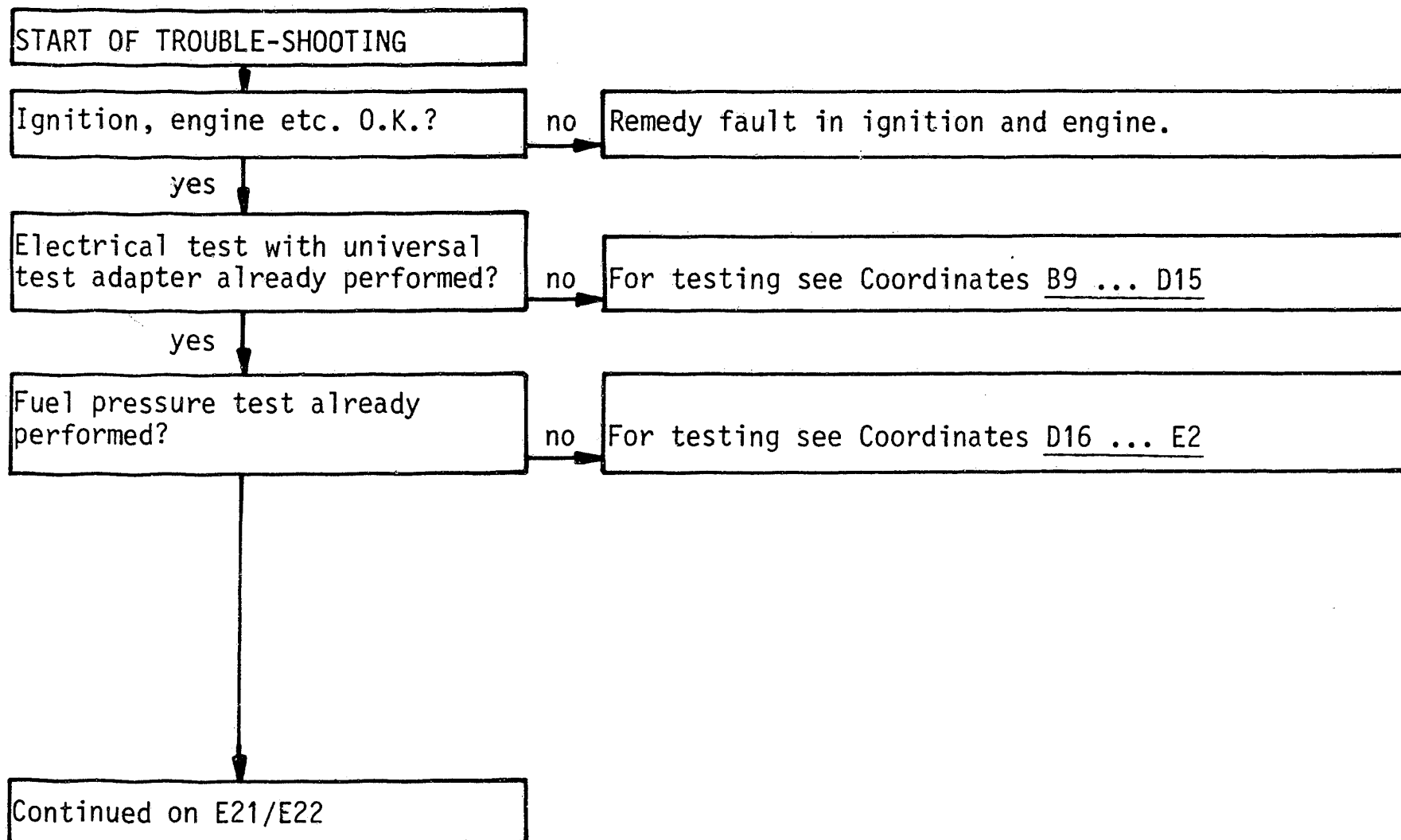
The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



E19

Engine starts but then dies
Lancia Gamma i.e.



E20

Engine starts but then dies
Lancia Gamma i.e.



Engine starts but then dies (continued)

Start valve O.K.?

no

Testing the start valve for leaks:

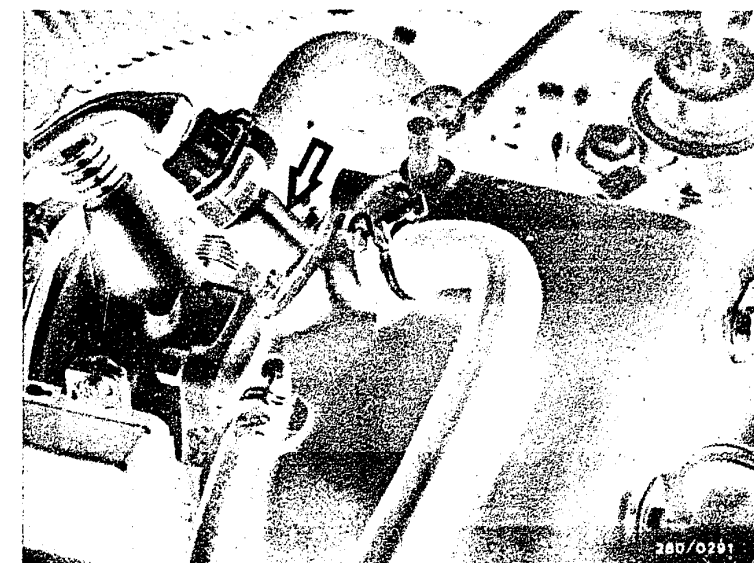
1. When installed: Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.
2. When removed: Remove start valve (Caution! Fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition on, and deflect air-flow sensor flap).

Test specification: within one minute max. 1 drop may form at the mouth of the valve.

Caution! After testing is completed, refit the hose between air filter and air-flow sensor.

yes

Continued on E23/E24

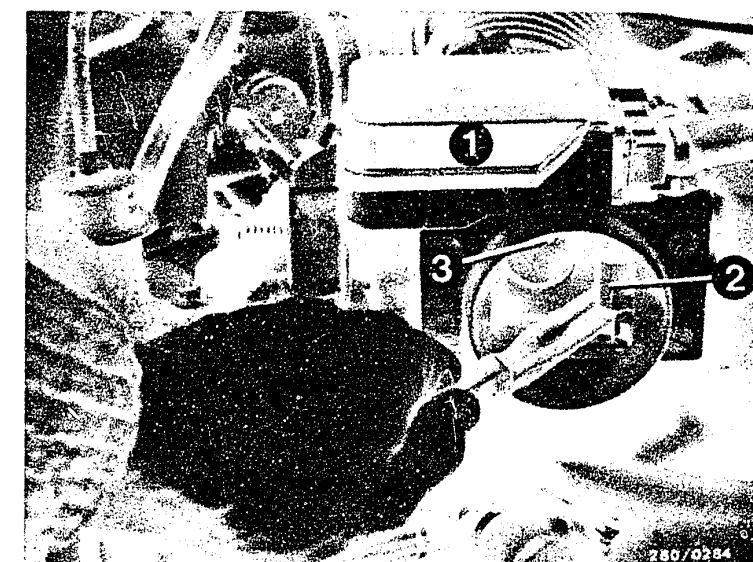


Arrow = Start valve

1 = Air-flow sensor

2 = Stopper

3 = Temperature sensor I



E21

Engine starts but then dies
Lancia Gamma i.e.



E22

Engine starts but then dies
Lancia Gamma i.e.



Engine starts but then dies (continued)

Auxiliary-air device tested
(mechanically O.K.?)

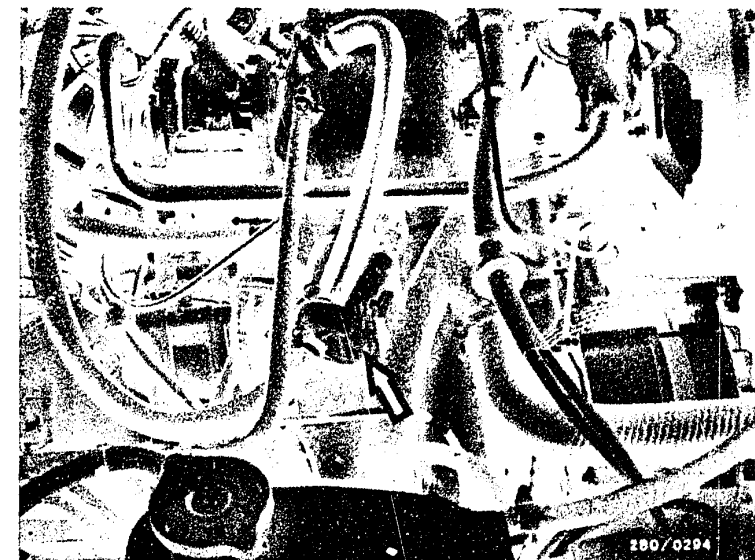
no

Testing:

1. Visual examination of auxiliary-air device.
When cold, the device must be opened; when the engine is warm, it must be closed. If not, replace auxiliary-air device. (Remove hoses and look down, possibly using a small mirror).
2. Functional test of auxiliary-air device:
With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

yes

Continued on F1/F2



Arrow = Auxiliary-air device

E23

Engine fails to start
Lancia Gamma i.e.



E24

Engine fails to start
Lancia Gamma i.e.



Engine starts but then dies (continued)

Temperature sensors tested?

no

Testing:

Temperature sensor I measures the intake air temperature and is located in the air duct of the air-flow sensor. Measure the following values between term. 27 and term. 6 of air-flow sensor:

1. At ambient temperature (approx. $+15^{\circ}\text{C} \dots +30^{\circ}\text{C}$):
 $1.45 \dots 3.3 \text{ k } \Omega$
2. With engine at normal op. temp. (approx. $+80^{\circ}\text{C}$):
 $280 \dots 360 \text{ } \Omega$

Make direct resistance measurement at temperature sensor II (engine) using ohmmeter. Resistance measurement at term. 13 and term. 49 (ground):

1. At ambient temperature (approx. $+15^{\circ}\text{C} \dots +30^{\circ}\text{C}$):
 $1.30 \dots 3.6 \text{ k } \Omega$
2. With engine at normal op. temp. (approx. $+80^{\circ}\text{C}$):
 $250 \dots 390 \text{ } \Omega$

If incorrect, check for open circuit or short circuit in the following leads using ohmmeter:

Temperature sensor I:

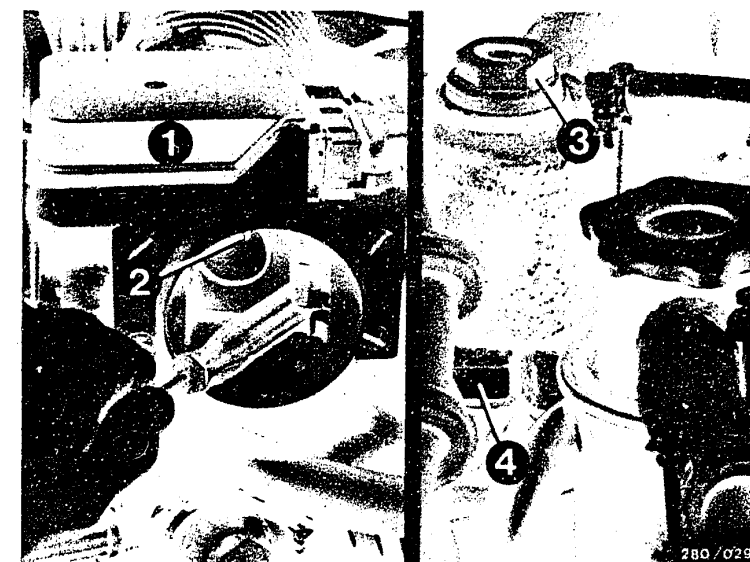
- From multiple plug term. 27 to air-flow sensor term. 27.
- From air-flow sensor term. 6 to multiple plug term. 6

Temperature sensor II:

- From multiple plug term. 13 to temperature sensor II term. 13.
- From temperature sensor II term. 49 to central ground (lead 49). Check all contacts in the plug-in connections.

yes

Continued on F3/F4



- 1 = Air-flow sensor
- 2 = Temperature sensor I
- 3 = Coolant bleeder screw
- 4 = Temperature sensor II (white plug)

F1

Engine starts but then dies
Lancia Gamma i.e.



F2

Engine starts but then dies
Lancia Gamma i.e.



Engine starts but then dies (Continued)

Air-flow sensor O.K.?

No

The air-flow sensor is secured on a bracket by 3 screws.

Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Deflect sensor flap.

Test specification: $100...500\ \Omega$
as of FD 049: $200...1000\ \Omega$

Checking the pump contact:

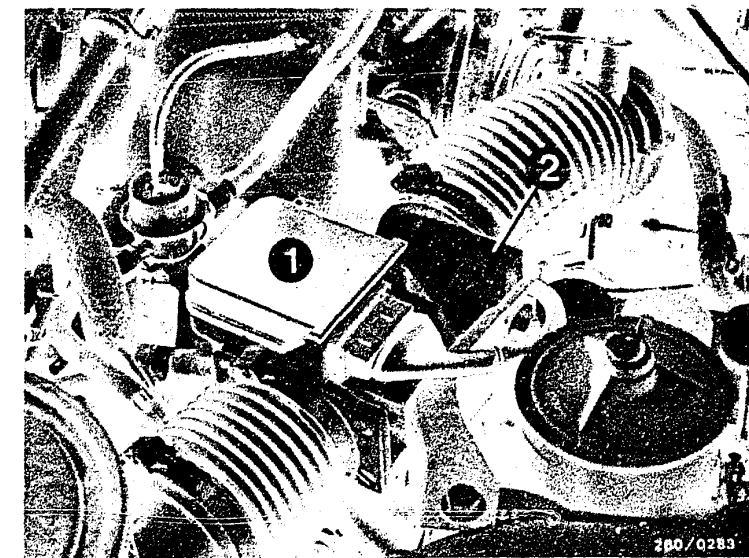
Remove plug from air-flow sensor. Measure resistance between term. 36 and term. 39 using ohmmeter. Deflect air-flow sensor flap. Set value approx. 0 Ω .

Caution:

After testing is completed, refit the pipe piece between air filter and air-flow sensor.

Yes

Continued on F5/F6



- 1 = Air-flow sensor
2 = CO adjusting screw
Turning in clockwise direction
= richer mixture

F3

Engine starts but then dies
Lancia Gamma i.e.



F4

Engine starts but then dies
Lancia Gamma i.e.



Engine starts but then dies (continued)

Are all hose lines and electric leads securely attached? Visual examination. Is the air-intake system leak-tight?

Yes

Testing completed for customer complaint

"Engine starts but then dies"

Customer complaint remedied?

No

Check whether hoses of air-intake system and of fuel line system are securely attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks with new seals or by re-tightening the connecting screws.

Checking for leaks:

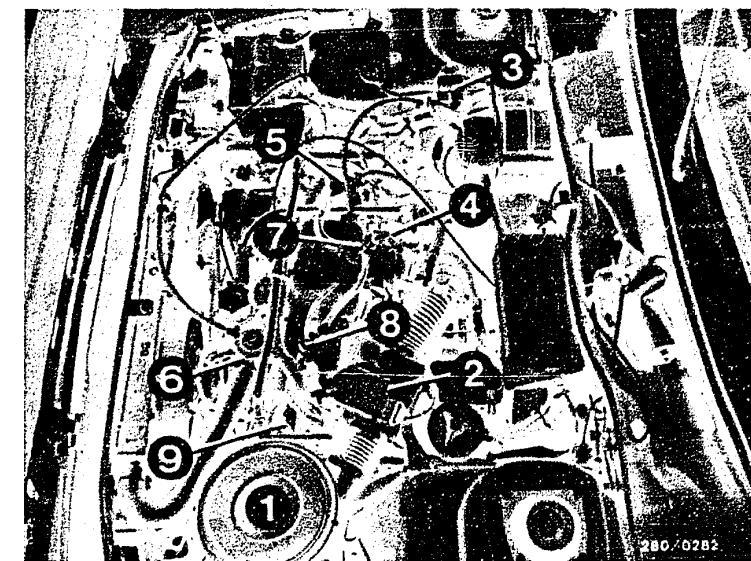
Seal off exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off connection port on auxiliary-air device. Open throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose connection.

No

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Relay set
- 4 = Throttle-valve switch
- 5 = Auxiliary-air device (black plug)
- 6 = Temperature sensor II (white plug)
Thermo-time switch (brown plug)
- 7 = Start valve
- 8 = Pressure regulator
- 9 = Injection valve

F5

Engine starts but then dies

Lancia Gamma i.e.



F6

Engine starts but then dies

Lancia Gamma i.e.



UNEVEN ENGINE IDLE, ENGINE-SPEED ADJUSTMENT (IDLE) AND EXHAUST-GAS ADJUSTMENT

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

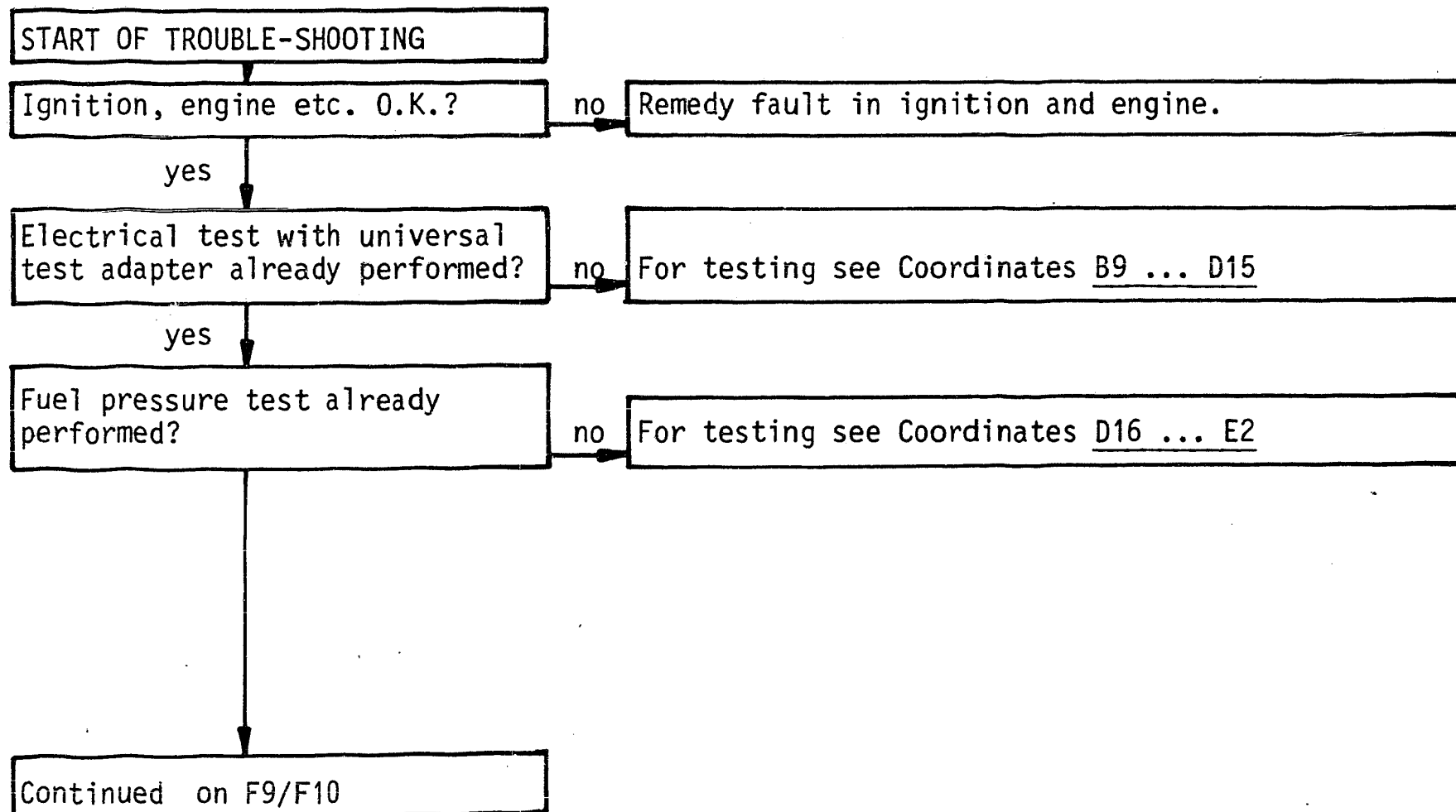
The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



F7

Uneven engine idle
Lancia Gamma i.e.



F8

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

Throttle valve closed?

no

Testing:

Throttle valve closed?

Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.

Set the throttle valve to a hair's breadth gap.

Caution: throttle valve must not stick.

Trouble-shooting:

Test the following leads for continuity with ohmmeter (set value approx. 0 Ω):

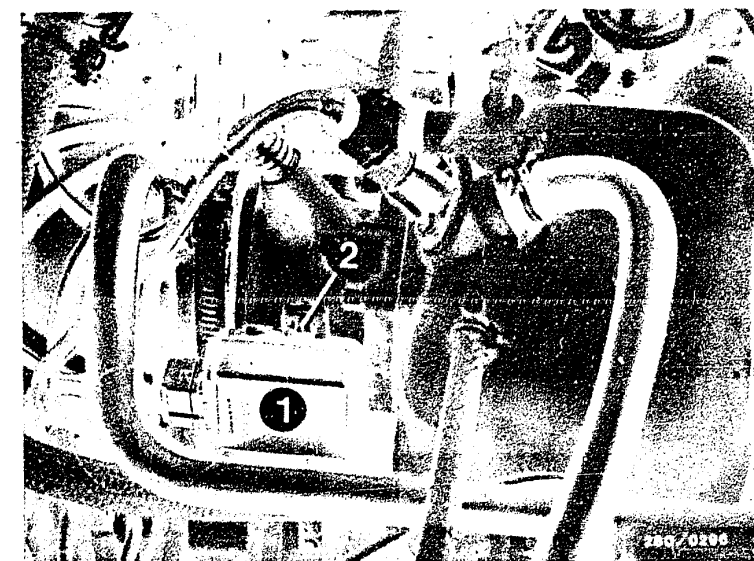
From multiple plug term. 2 to throttle-valve switch term. 2.

From throttle-valve switch term. 18 to multiple plug term. 18.

Eliminate contact resistances in the plug-in connections.

yes

Continued on F11/F12



1 = Throttle-valve switch
2 = Fastening screws

F9

Uneven engine idle
Lancia Gamma i.e.



F10

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

CO and idle speed correctly adjusted?

no

CO and idle adjustment:

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed:

Manually-shifted transmission, automatic transmission

(Selector lever in

position P: 900 ... 1000 min⁻¹

Air conditioner off)

CO adjustment: 1.5 ... 2.5 % by vol. CO

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Test idle speed and CO concentration again (as of FD 248 with hexagon-socket-head cap screw AF 5). Make corrections in several steps. After adjusting, use new plugs.

yes

Can engine speed not be adjusted?

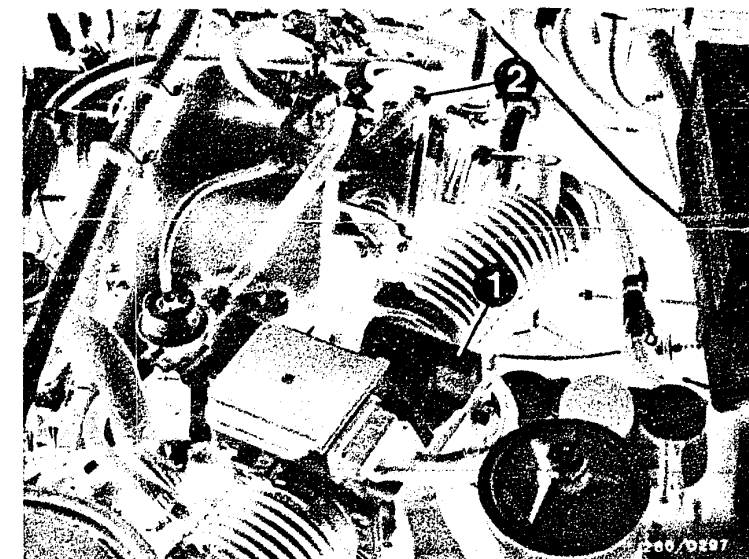
Thermo-time switch O.K.?

no

Electrical test: Test thermo-time switch as follows: Remove plug and make direct resistance measurement at thermo-time switch using ohmmeter.

yes

Continued on F13/F14

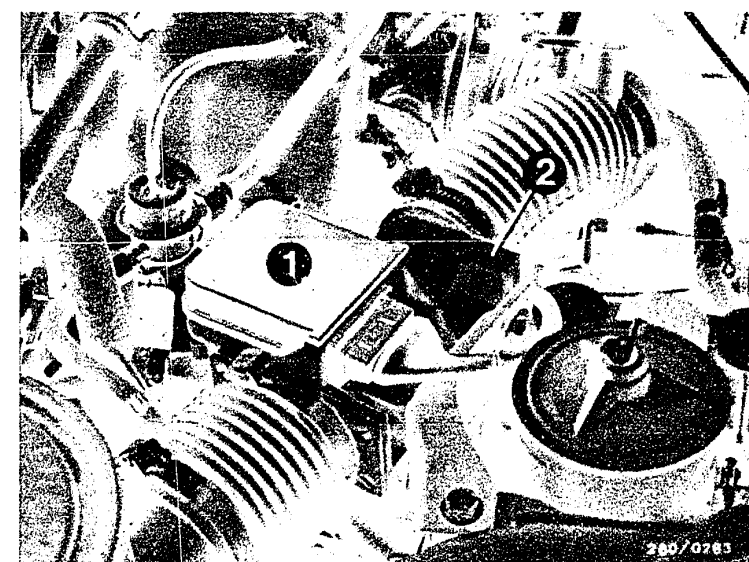


1 = CO adjusting screw

2 = Idle-speed adjusting screw

1 = Thermo-time switch
(brown plug)

2 = Coolant bleeder screw



F11

Uneven engine idle

Lancia Gamma i.e.



F12

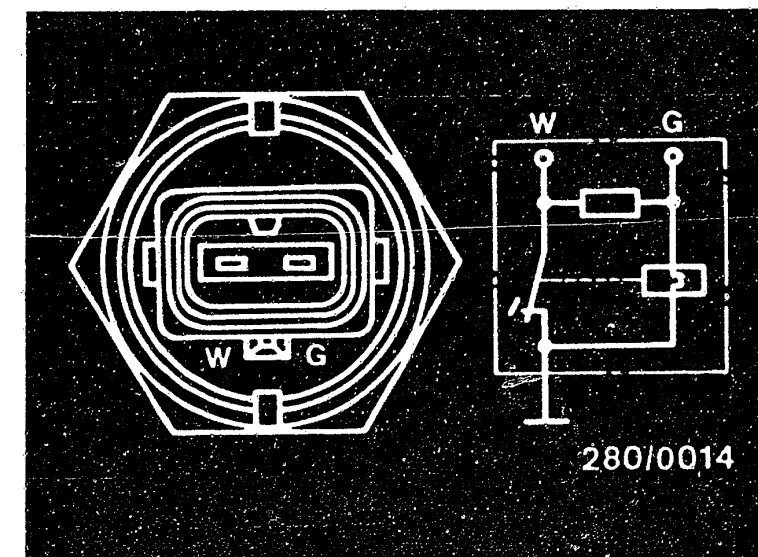
Uneven engine idle

Lancia Gamma i.e.



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

1. Between term. "G" and ground at ambient temperature
(below +30°C): 25...40 Ω
Engine at normal op. temp.
(above +40°C): 50...80 Ω
2. Between term. "W" and ground at ambient temperature
(below +30°C): 0 Ω
Engine at normal op. temp.
(above +40°C): 100...160 Ω
2. Between term. "G" and "W" at ambient temperature
(below +30°C): 25...40 Ω
Engine at normal op. temp.
(above +40°C): 50...80 Ω



Thermo time switch

Start valve O.K.?

No

Testing the start valve for leaks:

1. When installed

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

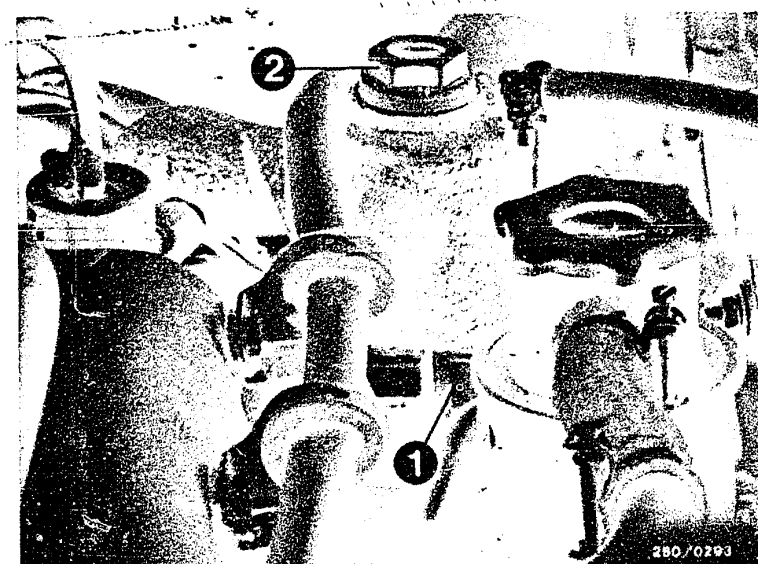
2. When removed:

Remove start valve (Caution: Fire hazard!). Fuel line and electric lead remain connected (place collector vessel under start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition "on" and deflect air-flow sensor flap). Test specification: Within 1 minute max. 1 drop may form at the mouth of the valve. Caution! After testing is completed, refit hose between air filter and air-flow sensor. Make sure there are no leaks.

yes

Continued on F15/F16

- 1 = Thermo-time switch (brown plug)
- 2 = Coolant bleeder screw



F13

Uneven engine idle
Lancia Gamma i.e.



F14

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

Auxiliary-air device tested
(mechanically O.K.?)

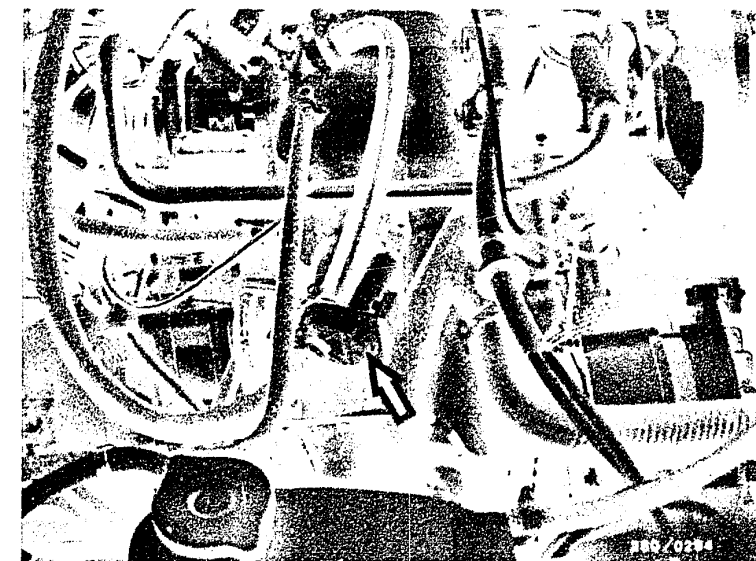
no

Testing:

1. Visual examination of auxiliary-air device.
When cold, the device must be opened; when the engine is warm, it must be closed. If not, replace auxiliary-air device. (Remove hoses and look down, possibly using a small mirror).
2. Functional test of auxiliary-air device:
With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

yes

Continued on F17/F18



Arrow = Auxiliary-air device

F15

Uneven engine idle
Lancia Gamma i.e.



F16

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, engine-speed adjustment (idle) and exhaust-gas adjustment
(continued)

Solenoid-operated injection
valve O.K.?

no

1. Mechanical test:

With the engine running, disconnect the injection-valve connectors individually, one after the other, from the injection valve and plug on again. Engine speed must drop if injection valve O.K. Test connecting leads of relay set term. 88b, term. 88e through injection valves to control unit term. 14, 15, 32 and 33 for continuity. If necessary, replace leads or injection valves.

2. Functional test

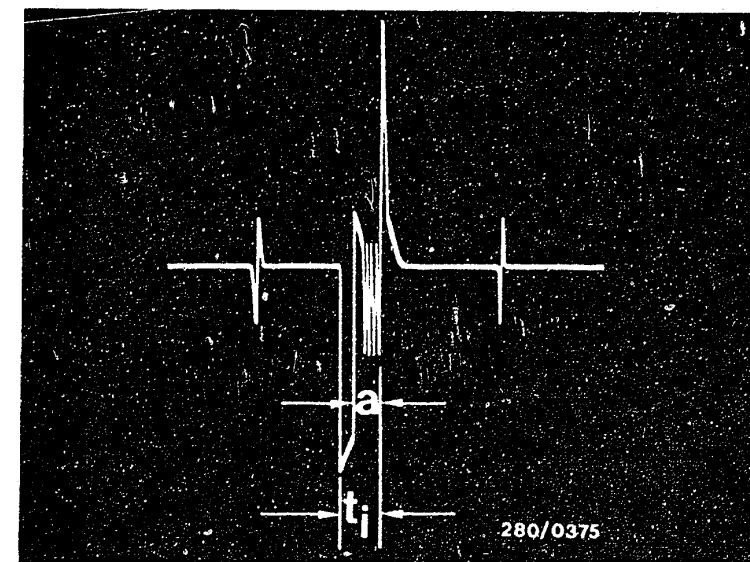
Connect test lead as follows:

The two-pole plug-in connections of the test lead are connected between an injection valve and its connecting lead. Of the other two terminals of the test lead, only one terminal must be connected to the special input of the motortester. Insulate the free terminal (danger of short circuit). If the correct terminal is connected, the oscilloscope pattern shown opposite is visible. With the aid of the test lead it is possible to test the injection pulses at the injection valves with an ignition oscilloscope with the engine running. If the pattern shown opposite is not obtained or if there are differences (interference, missing etc.) the other injection valves should also be tested. In case of interference, check routing of leads. If missing, remedy loose contacts in leads or in plug-in connections.

yes

Continued on F23/F24

Continued on F19/F20



Injection pulse of a current-regulated output stage (measured at the injection valve)

a = Pulse length (dependent on engine load)

t_i = Injection pulse

At idle with no load on engine the current regulation a is not yet visible on the oscilloscope.

F17

Uneven engine idle
Lancia Gamma i.e.



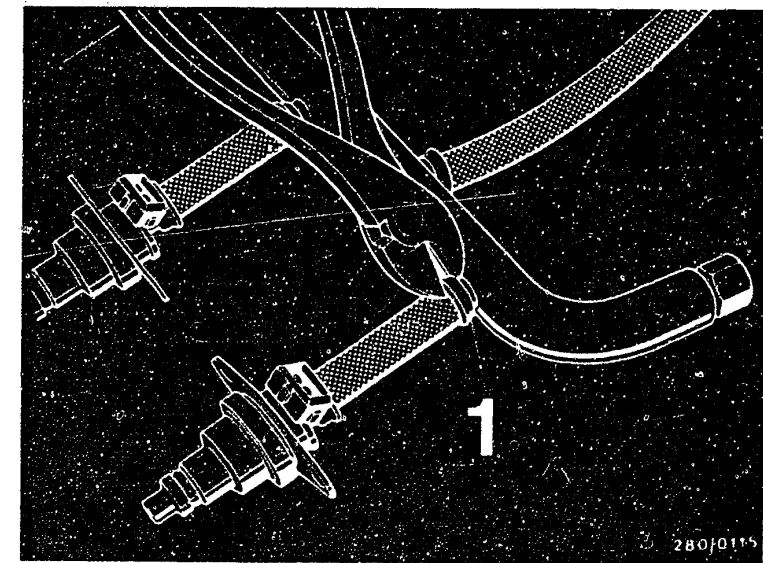
F18

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, engine-speed adjustment (idle) and exhaust-gas adjustment
(continued)

3. Replacing the injection valves
Break open the hose-termination sleeves of the injection valves.
Cut open the fuel hose in the longitudinal direction with a soldering iron or soldering gun and pull off (arrow).

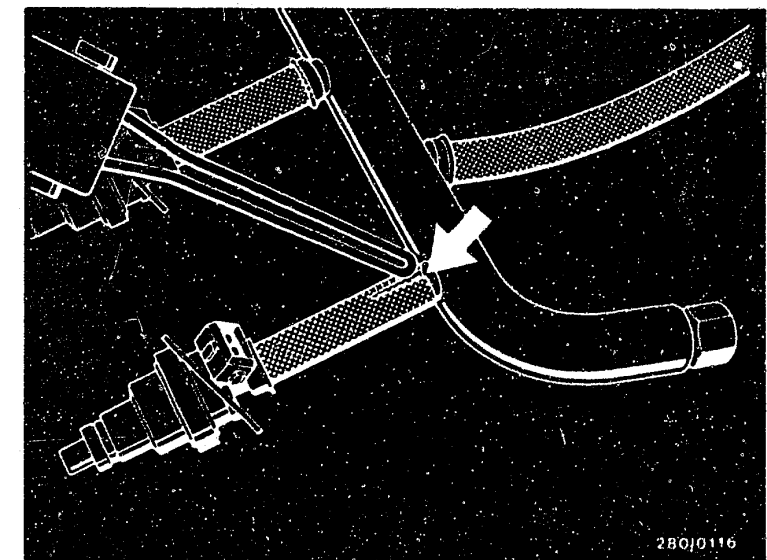


1 = Hose-termination sleeve

yes

Continued on F23/F24

Continued on F21/F22



Uneven engine idle, engine-speed adjustment(idle) and exhaust-gas adjustment
(continued)

yes

Fit new or repaired injection valve with hose-termination sleeve. To do this, wet inside of hose with fuel and slide onto fitting as far as it will go.

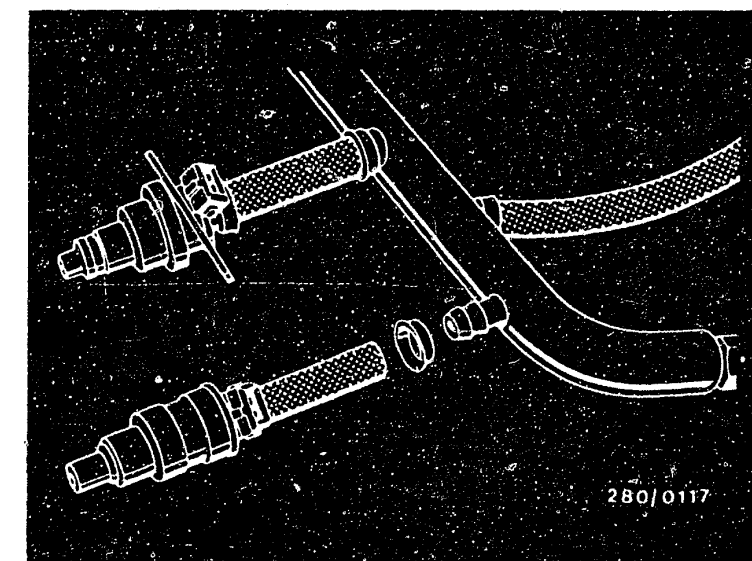
Installing the injection valves

Ensure proper seating of rubber seals on each injection valve. Replace defective seals. Press all injection valves uniformly into their seats with the fuel-distribution pipes.

Important! All injection valves must be installed leak-tight. Mount fuel-distribution pipe (screw down injection valves with mounting plate on intake manifold). Also screw down central fastener and return fastener. Plug on all air/vacuum hoses. Plug on cup seals on air-flow sensor and throttle-valve assembly. Also securely tighten on auxiliary-air device, solenoid-operated air valve and crankcase breather.

Check all fuel and air hose connections once again for security.

Start engine and check whether any unmetered air is being drawn in.

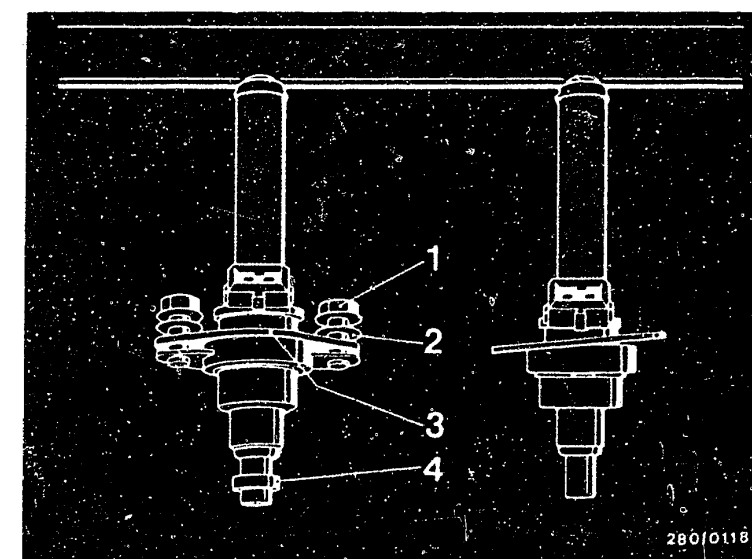


280/0117

1 = Hose-termination sleeve

1 = Hexagon screw
2 = Washer
3 = Holder
4 = Rubber ring

} Similar on
Lancia Gamma



280/0118

Continued on F23/24

F21

Uneven engine idle
Lancia Gamma i.e.



F22

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

Air-flow sensor O.K. ?

no

The air-flow sensor is secured on a bracket by 3 screws.

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor.

Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

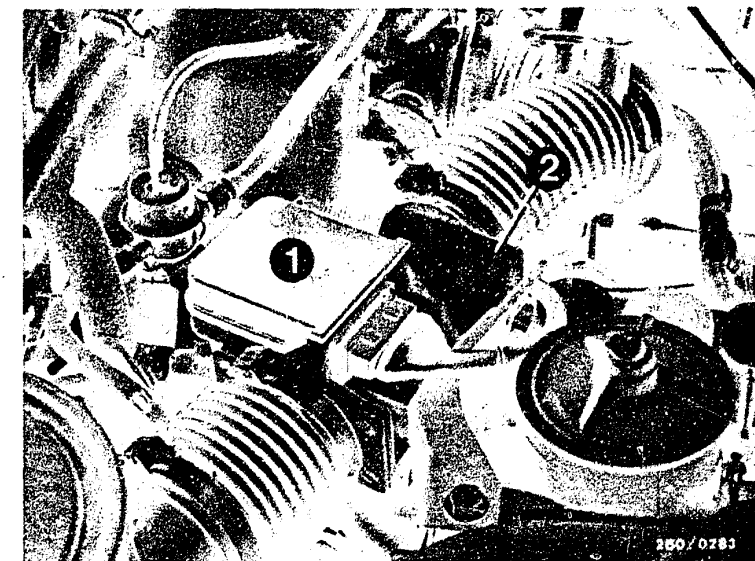
Test specification: $\frac{100...500 \Omega}{\text{as of FD 049 } 200...1000 \Omega}$

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.

yes

Continued on G1/G2



1 = Air-flow sensor

2 = CO adjusting screw

Turning in clockwise direction
= richer mixture

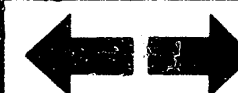
F23

Uneven engine idle
Lancia Gamma i.e.



F24

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, engine-speed adjustment (idle) and exhaust-gas adjustment
(continued)

Solenoid-operated air valve for
air conditioner O.K.?

no

Operation:

After switching on the air conditioner, the solenoid-operated air valve opens and the idle speed remains unchanged.

Testing:

It is essential that CO and idle speed are correctly adjusted. Ignition "ON", engine stopped, switch on air conditioner.

Measure voltage at solenoid-operated air valve. Set value 8 ... 15 V.

If no voltage, test connecting leads, magnetic clutch (compressor) and operating switch (instrument panel).

If voltage present, start engine and allow to run.

- Engine speed with air conditioner on too low (below 900 min⁻¹):

Replace solenoid-operated air valve.

- Engine speed with air conditioner off too high (above 1000 min⁻¹):

Pinch off hose before solenoid-operated air valve.

If engine speed now O.K., replace solenoid-operated air valve.

There must be no voltage across the solenoid-operated air valve.

- Air-adjusting screw correctly adjusted?
(Essential that idle and CO correctly adjusted)
Adjusting: The air-adjusting screw should be adjusted so that the idle speed remains constant when the air conditioner is switched on.

yes

Continued on G3/G4

G1

Uneven engine idle
Lancia Gamma i.e.



G2

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment
(continued)

Are all hose lines and electric leads securely connected? Visual examination.
Is the air-intake system leak-tight?

no

Check whether hoses of air-intake system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by re-tightening the connecting screws.

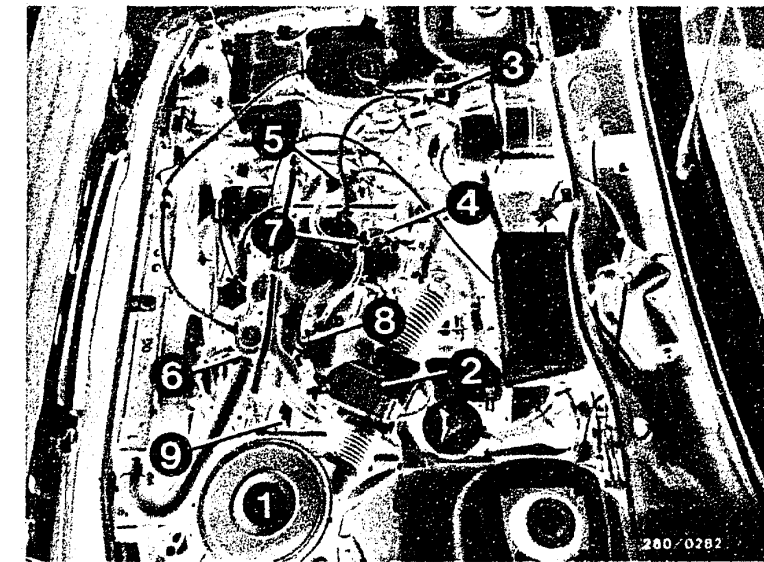
Leak test:

Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose contacts.

yes

Continued on G5/G6



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Relay set
- 4 = Throttle-valve switch
- 5 = Auxiliary-air device (black plug)
- 6 = Temperature sensor II (white plug)
Thermo-time switch (brown plug)
- 7 = Start valve
- 8 = Pressure regulator
- 9 = Injection valve

G3

Uneven engine idle
Lancia Gamma i.e.



G4

Uneven engine idle
Lancia Gamma i.e.



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

CO and engine speed correctly adjusted?

no

CO and idle adjustment:

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed:

Manually-shifted transmission, automatic transmission

(Selector lever in

position P:

900 ... 1000 min⁻¹

Air conditioner off)

CO adjustment: 1.5 ... 2.5 % by vol. CO

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Test idle speed and CO concentration again (as of FD 248 with hexagon-socket-head cap screw AF 5). Make corrections in several steps. After adjusting, use new plugs.

Can engine speed not be adjusted?

yes

yes

Testing completed for customer complaint

"Uneven engine idle, engine-speed adjustment (idle) and exhaust-gas adjustment".

Customer complaint remedied?

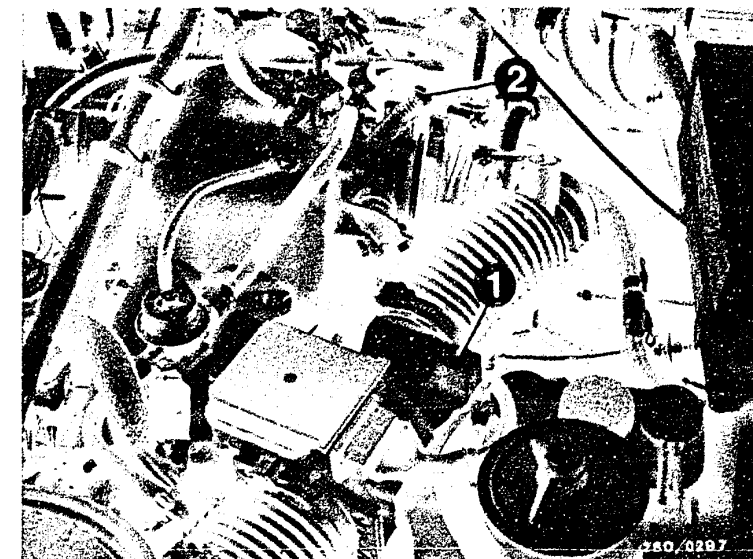
no

Further possibilities:

Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "Direct trouble-shooting", see "Detailed trouble-shooting" (Coordinates B3/B4).

Engine not mechanically O.K.

(Compression, valve setting, valve timing, worn camshaft).



1 = CO adjusting screw

2 = Idle-speed adjusting screw

G5

Uneven engine idle
Lancia Gamma i.e.



G6

Uneven engine idle
Lancia Gamma i.e.



POOR THROTTLE TAKE-UP

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

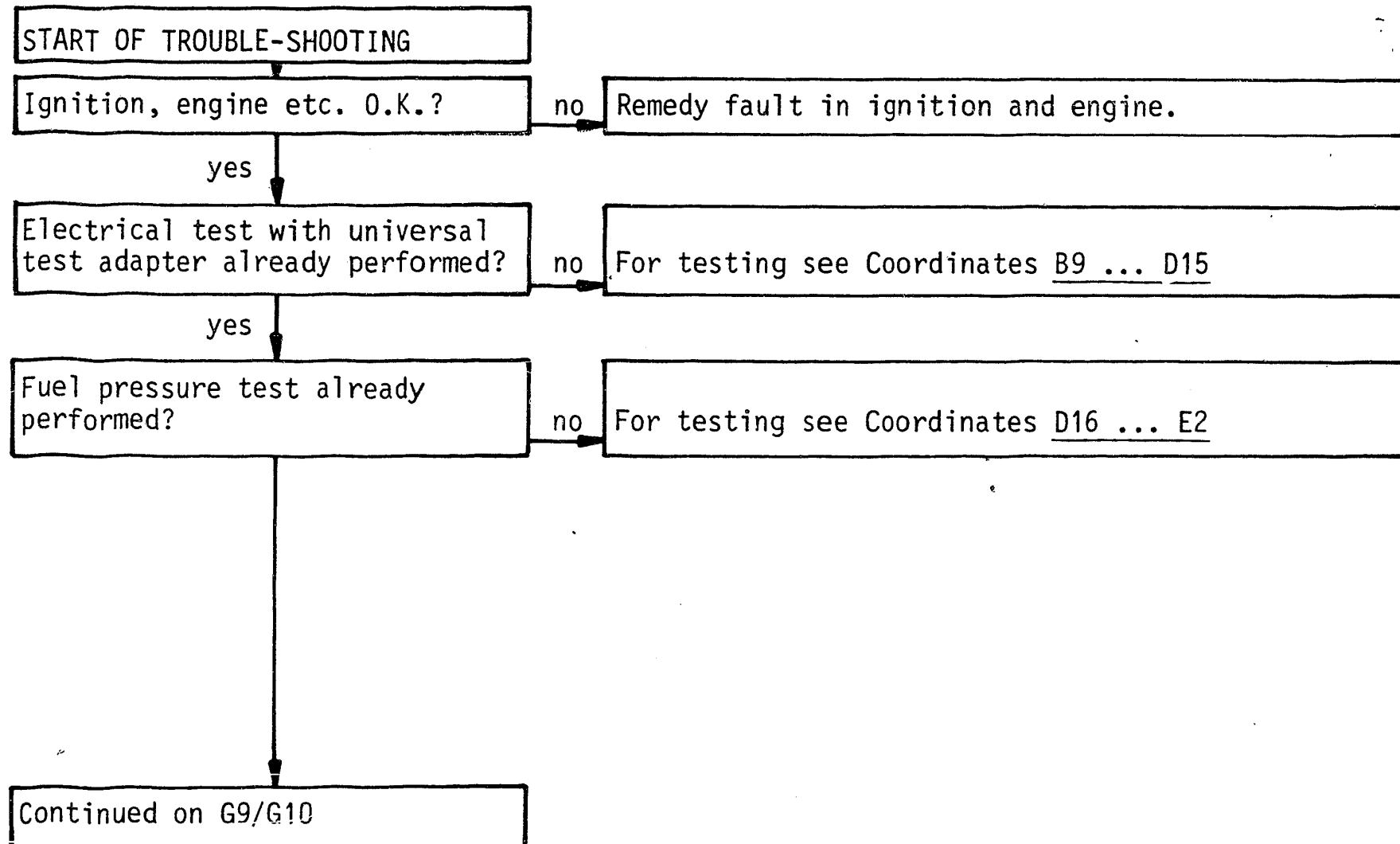
The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



G7

Poor throttle take-up
Lancia Gamma i.e.



G8

Poor throttle take-up
Lancia Gamma i.e.



Poor throttle take-up (continued)

Throttle valve closed?

no

Testing:

Throttle valve closed?

Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.

Set the throttle valve to a hair's breadth gap.

Throttle-valve switch is not adjustable.

Trouble-shooting:

Test the following leads for continuity with ohm-meter (set value approx. $0\ \Omega$):

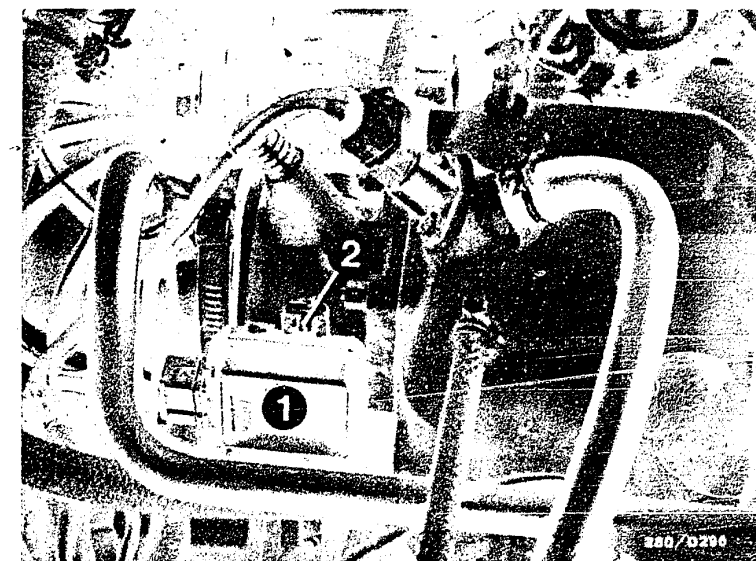
From multiple plug term. 2 to throttle-valve switch term. 2.

From throttle-valve switch term. 18 to multiple plug term. 18.

Eliminate contact resistances in the plug-in connections.

yes

Continued on G11/G12



1 = Throttle-valve switch
2 = Fastening screws

G9

Poor throttle take-up

Lancia Gamma i.e.



G10

Poor throttle take-up

Lancia Gamma i.e.



Poor throttle take-up (continued)

Auxiliary-air device tested?
(mechanically O.K.?)

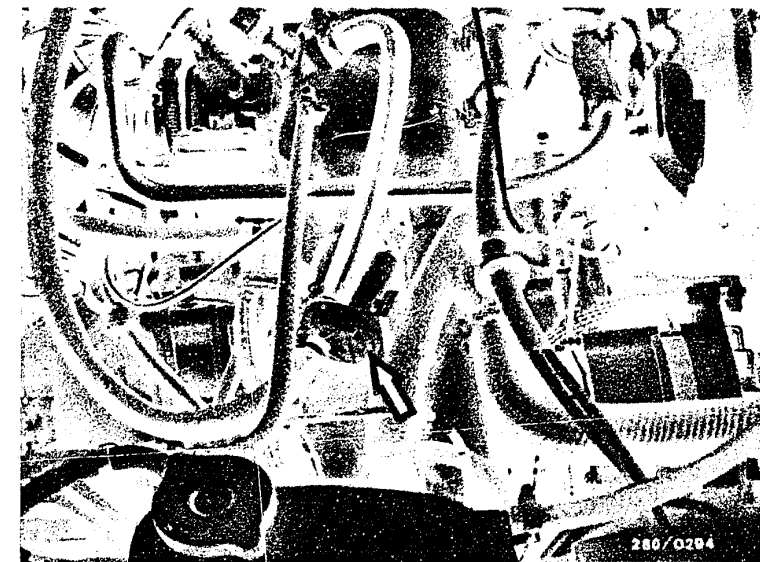
no

Testing:

1. Visual examination of auxiliary-air device.
When cold, the device must be opened; when the engine is warm, it must be closed. If not, replace auxiliary-air device. (Remove hoses and look down, possibly using a small mirror).
2. Functional test of auxiliary-air device:
With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

yes

Continued on G13/G14



Arrow = Auxiliary-air device

G11

Poor throttle take-up
Lancia Gamma i.e.



G12

Poor throttle take-up
Lancia Gamma i.e.



Poor throttle take-up (continued)

Air-flow sensor O.K.?

no

The air-flow sensor is secured on a bracket with 3 screws.

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor.

Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

Test specification: $100...500\ \Omega$
as of FD 049 $200...1000\ \Omega$

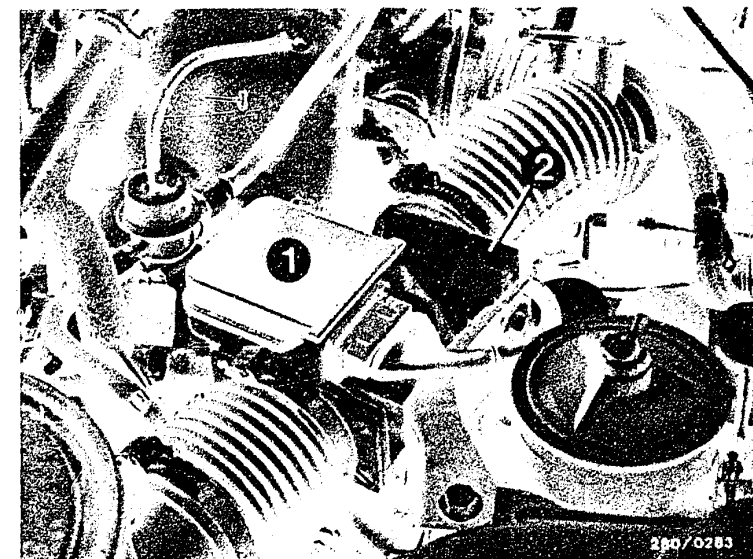
Potentiometer test: (noise test):

Remove air-flow sensor. (Loosen hose clamps on both sides of air-flow sensor. Loosen air-flow sensor fastening screws; leave plug on). Set motortester to special input and connect with special cable to air-flow sensor term. 7 (red clip) and term. 6 (black clip).

yes

Continued on G17/G18

Continued on G15/G16



1 = Air-flow sensor

2 = CO adjusting screw

Turning in clockwise direction =
richer mixture

G 13

Poor throttle take-up
Lancia Gamma i.e.



G 14

Poor throttle take-up
Lancia Gamma i.e.



Poor throttle take-up (continued)

Making the adapter lead:

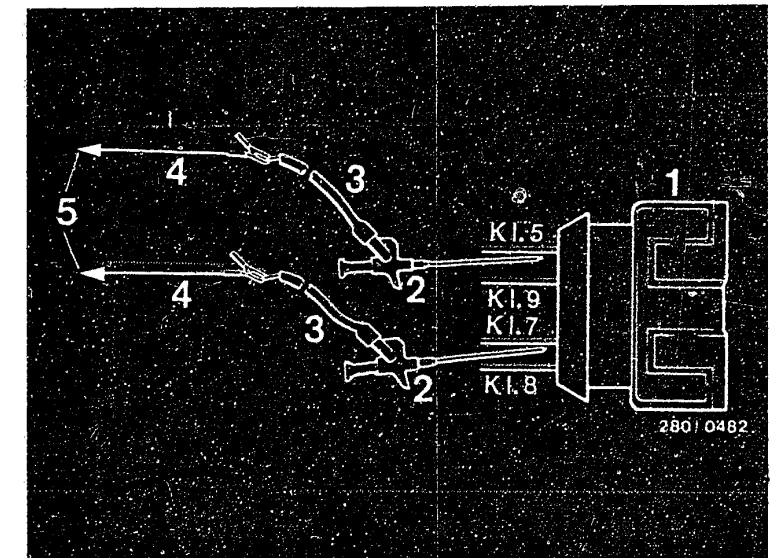
User fabrication: Two approx. 1 m long leads of approx. 1.5 mm² cross section. On one end 2 test prods are attached. On the other end strip off approx. 2 cm of insulation and connect clamps of special input connecting lead.

Caution!

Insulate bare connection points of adapter lead. (Danger of short circuit). Measure carefully into the plug of the air-flow sensor. Do not bend any spring contacts. Set control lever for image adjustment on motortester as far as it will go to the left (calibrated setting). Ignition "ON". Deflect air-flow sensor flap suddenly several times. If air-flow sensor O.K., a continuous stroke signal must be visible on the oscilloscope. If air-flow sensor defective, there is a noise signal similar to that shown in the diagram opposite. Replace air-flow sensor. Disconnect adapter lead after testing and plug on rubber sleeve properly. Mount air-flow sensor. Connect all hoses and tighten (leaks).

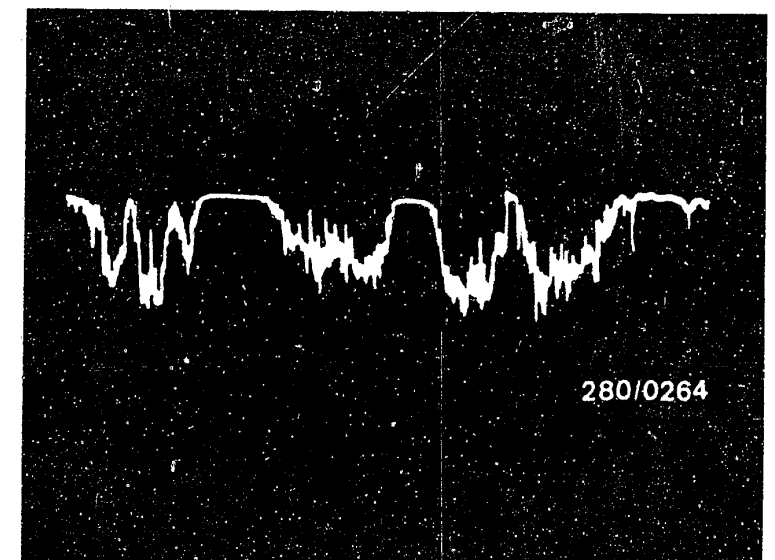
yes

Continued on G17/18



- 1 = Air-flow sensor plug
- 2 = Test prod
- 3 = Adapter lead (user-fabricated)
- 4 = Special input connecting lead
- 5 = Special input on motortester

Noise signal if air-flow sensor defective.



G 15

Poor throttle take-up
Lancia Gamma i.e.



G 16

Poor throttle take-up
Lancia Gamma i.e.



Poor throttle take-up (continued)

Are all hose lines and electric leads securely connected? Visual examination.
Is the air-intake system leak-tight?

no

Check whether hoses of air-intake system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by re-tightening the connecting screws.

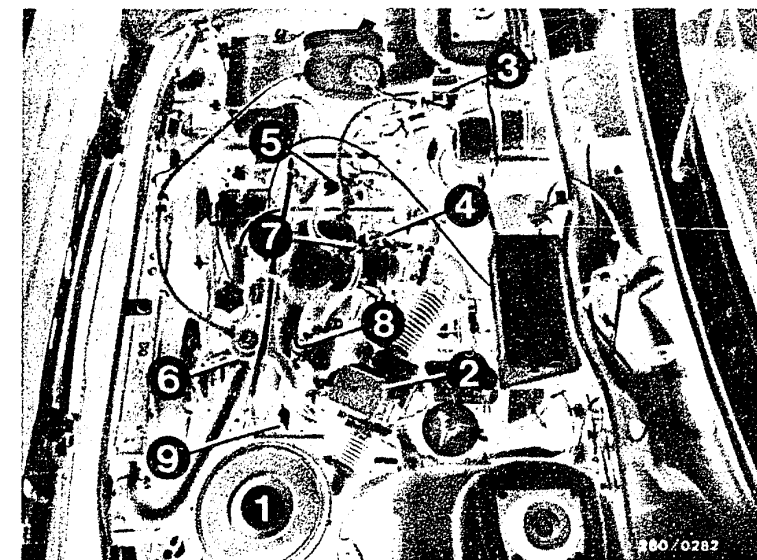
Leak test:

Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose contacts.

yes

Continued on G19/G20



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Relay set
- 4 = Throttle-valve switch
- 5 = Auxiliary-air device (black plug)
- 6 = Temperature sensor II (white plug)
Thermo-time switch (brown plug)
- 7 = Start valve
- 8 = Pressure regulator
- 9 = Injection valve

G17

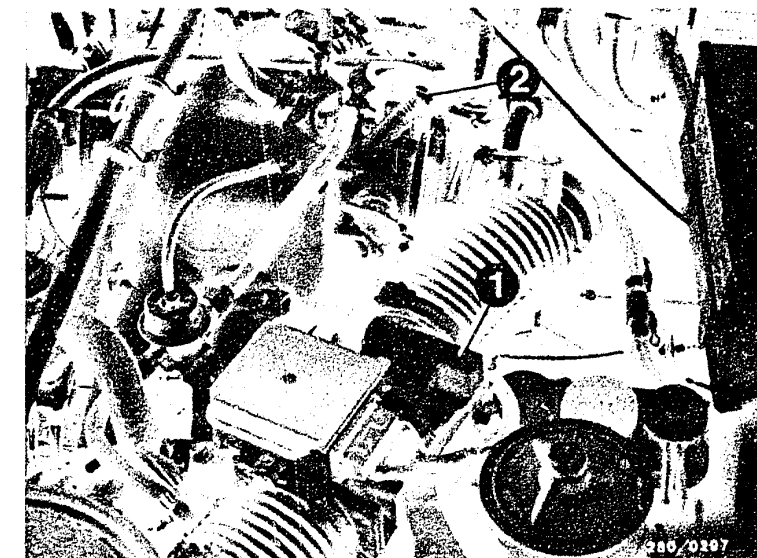
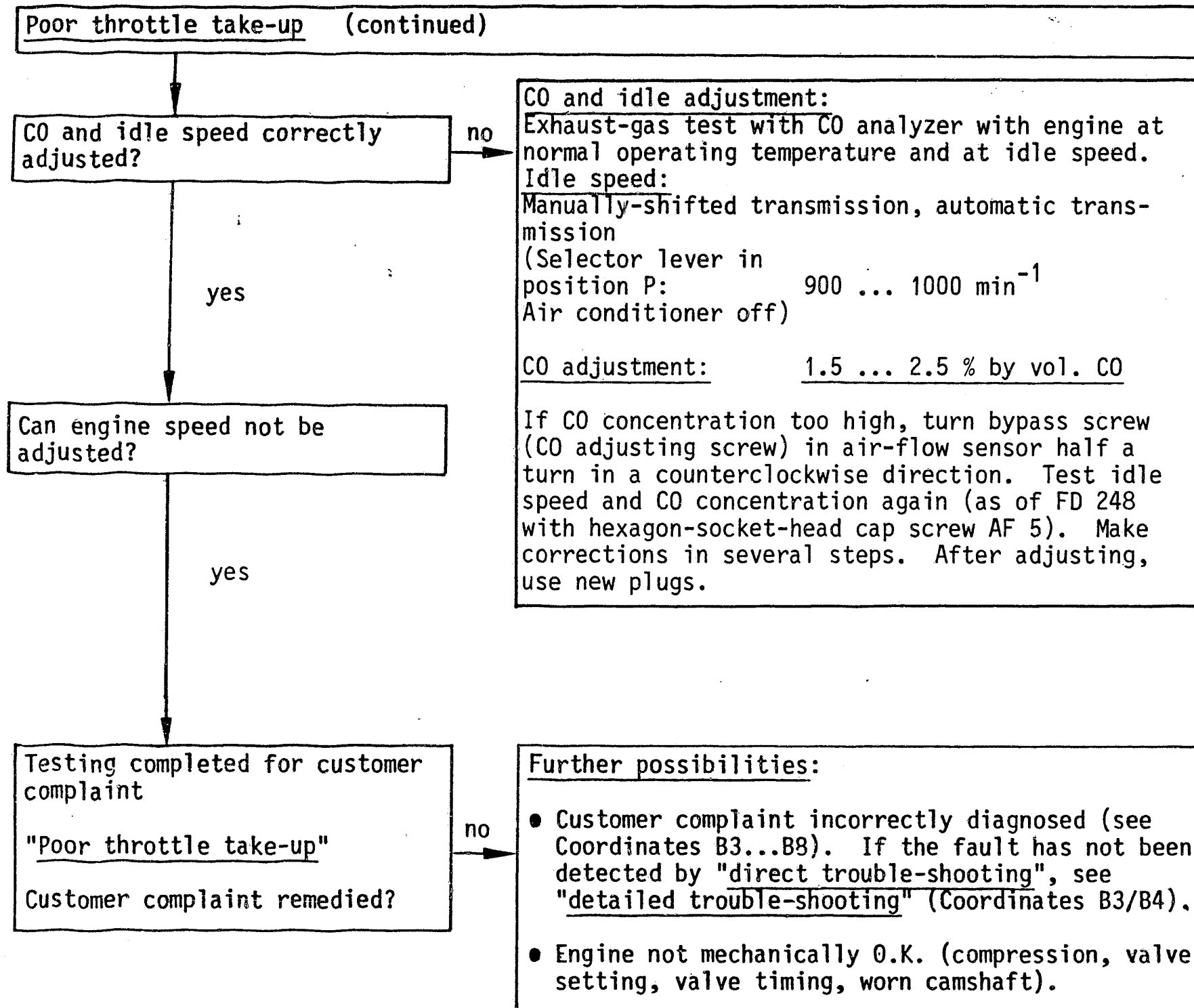
Poor throttle take-up
Lancia Gamma i.e.



G18

Poor throttle take-up
Lancia Gamma i.e.





1 = CO adjusting screw
2 = Idle-speed adjusting screw



ENGINE MISSING UNDER ALL OPERATING CONDITIONS

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.

START OF TROUBLE-SHOOTING

Ignition, engine etc. O.K.?

no

Remedy fault in ignition and engine.

yes

Electrical test with universal
test adapter already performed?

no

For testing see Coordinates B9 ... D15

yes

Fuel pressure test already
performed?

no

For testing see Coordinates D16 ... E2

yes

Continued on H3/H4

H1

Engine missing

Lancia Gamma i.e.

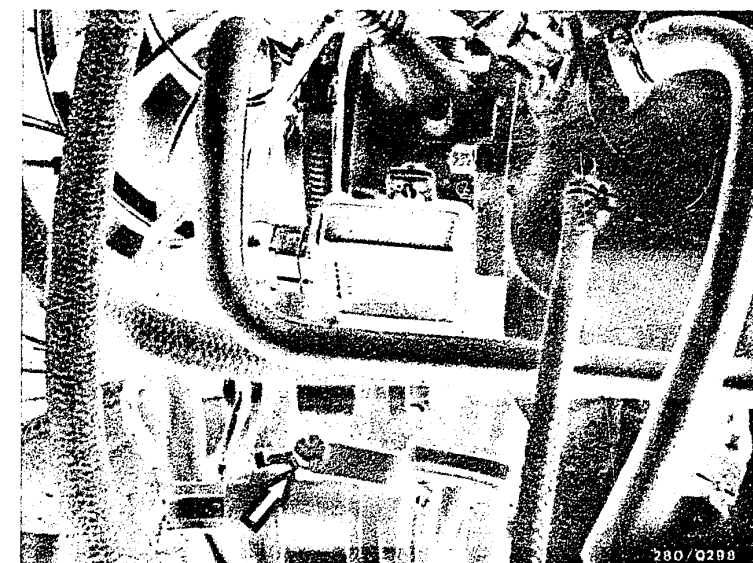
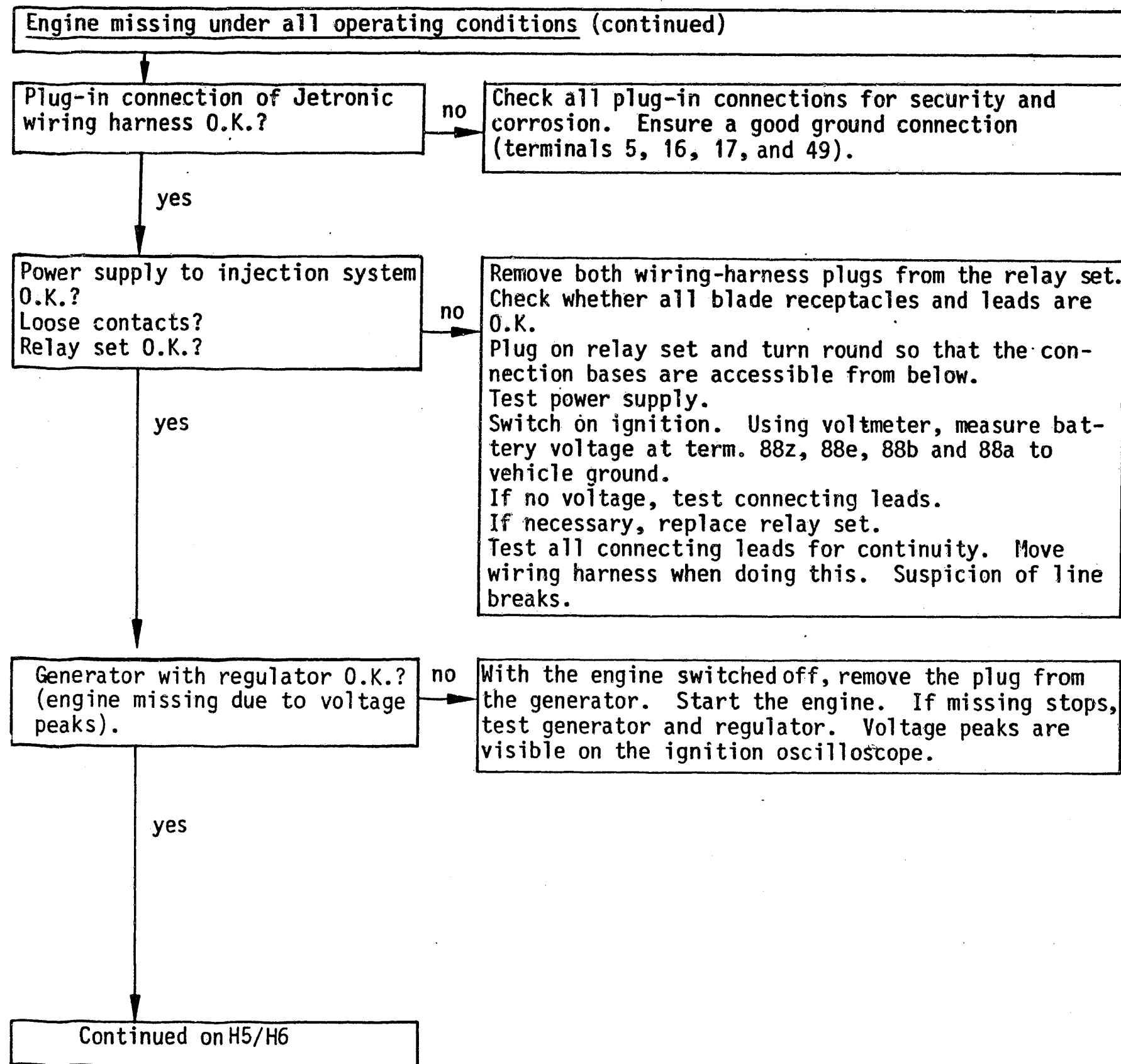


H2

Engine missing

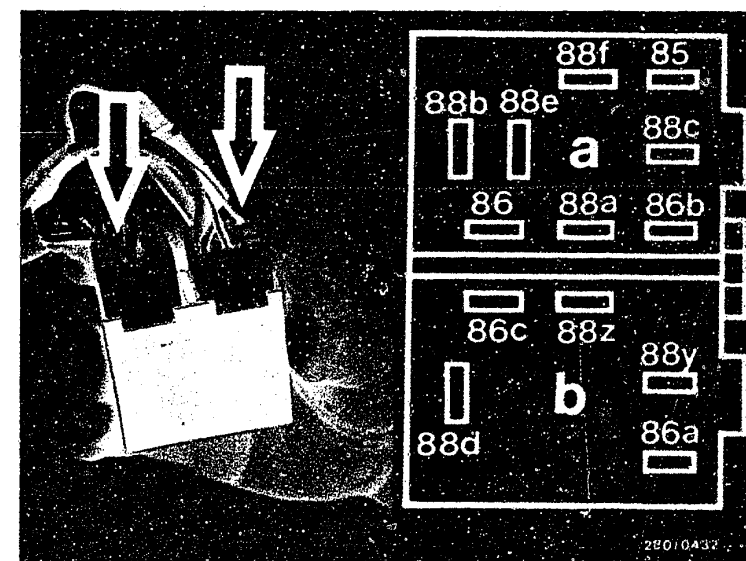
Lancia Gamma i.e.





Arrow = Central ground terminal on transmission housing

Measure voltage on back of plug.
a = Jetronic wiring harness
b = Vehicle wiring harness
(on relay set
0 332 514 105 no term. 88f)



H3

Engine missing under all op. conditions
Lancia Gamma i.e.



H4

Engine missing under all op. conditions
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

Air-flow sensor O.K.?

no

The air-flow sensor is secured on a bracket with 3 screws.

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor.

Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

Test specification: $100...500\ \Omega$
as of FD 049 $200...1000\ \Omega$

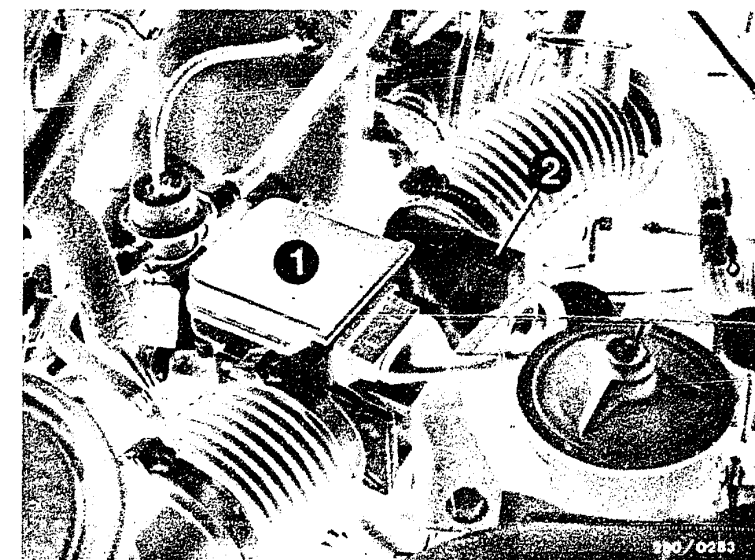
Potentiometer test: (noise test):

Remove air-flow sensor. (Loosen hose clamps on both sides of air-flow sensor. Loosen air-flow sensor fastening screws; leave plug on). Set motortester to special input and connect with special cable to air-flow sensor term. 7 (red clip) and term. 6 (black clip).

yes

Continued on H13/H14

Continued on H7/H8



1 = Air-flow sensor

2 = CO adjusting screw

Turning in clockwise direction =
richer mixture

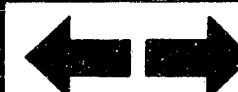
H5

Engine missing under all op. conditions
Lancia Gamma i.e.



H6

Engine missing under all op. conditions
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

Making the adapter lead:

User fabrication: Two approx. 1 m long leads of approx. 1.5 mm² cross section. On one end 2 test prods are attached. On the other end strip off approx. 2 cm of insulation and connect clamps of special input connecting lead.

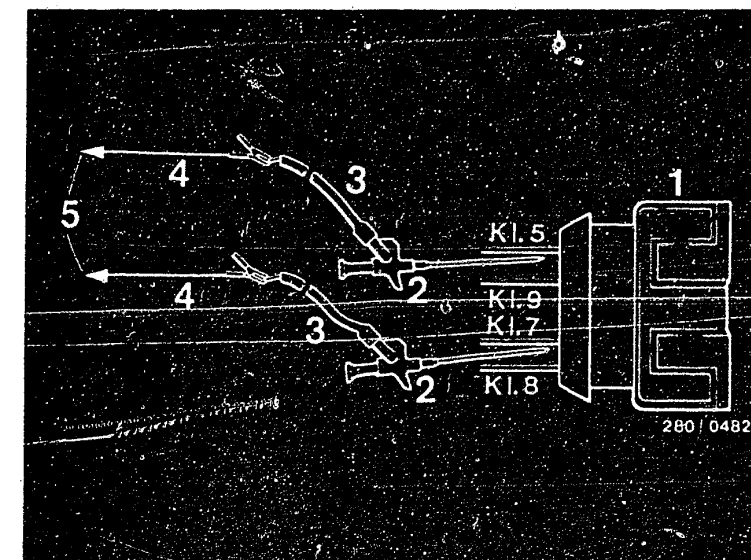
Caution!

Insulate bare connection points of adapter lead. (Danger of short circuit). Measure carefully into the plug of the air-flow sensor. Do not bend any spring contacts. Set control lever for image adjustment on motortester as far as it will go to the left (calibrated setting). Ignition "ON". Deflect air-flow sensor flap suddenly several times. If air-flow sensor O.K., a continuous stroke signal must be visible on the oscilloscope. If air-flow sensor defective, there is a noise signal similar to that shown in the diagram opposite. Replace air-flow sensor. Disconnect adapter lead after testing and plug on rubber sleeve properly. Mount air-flow sensor. Connect all hoses and tighten (leaks).

yes

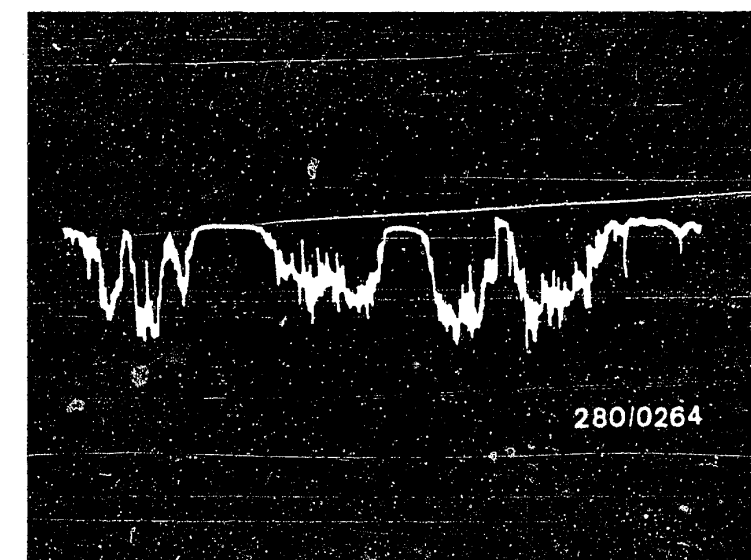
Continued on H13/H14

Continued on H9/H10



- 1 = Air-flow sensor plug
- 2 = Test prod
- 3 = Adapter lead (user-fabricated)
- 4 = Special input connecting lead
- 5 = Special input on motortester

Noise signal if air-flow sensor defective.



H7

Engine missing under all op. conditions
Lancia Gamma i.e.



H8

Engine missing under all op. conditions
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

yes

Engine stopped:

Disconnect plug from air-flow sensor and connect ohmmeter to term. 6 and term. 36. Positive pole of ohmmeter to term. 6:

approx. $0\ \Omega$

With reversed polarity: approx. $\infty\ \Omega$.

Procedure if incorrect:

- If applicable, remedy faulty contact of plug-in connection 88z, 86c and 85 on relay set.

- If pump contact bent, test CO.

- Checking the CO adjustment:
1.5 ... 2.5 % by vol. CO

- Idle adjustment: 900 ... 1000 min⁻¹

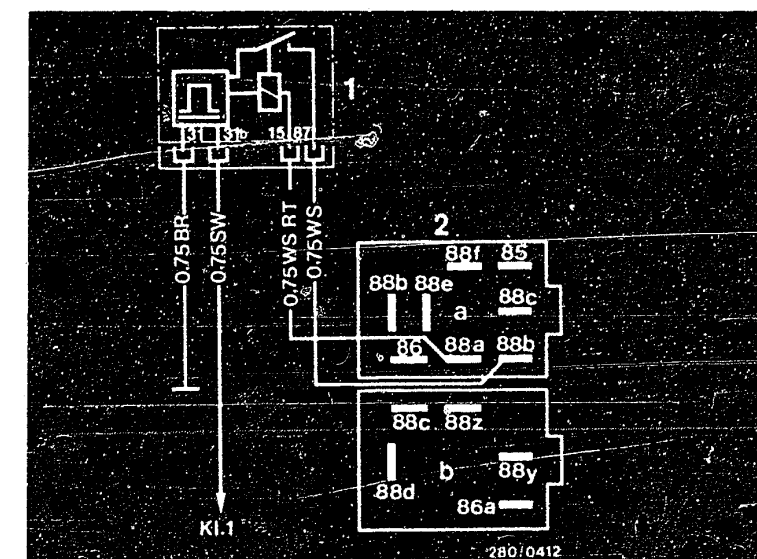
- Check engine intake valve (possibly valve clearance too tight).

Proceed as follows if pump contact in air-flow sensor defective

If the air-flow sensor is completely O.K. except for the pump contact, it is possible to proceed as follows (see installation plans opposite).

Continued on H13/H14

Continued on H11/H12



1 = Fuel pump relay - Striebel (part no. 896460).

2 = Relay set
Connection base viewed from below

a = Jetronic wiring harness

b = Vehicle wiring harness

Wiring harness - user-fabrication
(On relay set 0 332 514 105 no term. 88f)

H9

Engine missing
Lancia Gamma i.e.



H10

Engine missing
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

Installation instructions:

Connect relay base to the user-fabricated wiring harness. Mount relay base for fuel pump relay in a suitable place.

Connect brown lead of user-fabricated wiring harness to a ground point.

Remove relay set.

Run white and red/white leads of user-fabricated wiring harness in the engine compartment and connect to relay set as per circuit diagram.

Run black lead of user-fabricated wiring harness to the ignition coil. Connect lead to ignition coil terminal 1.

Caution!

After testing is completed, reconnect the hose between air filter and air-flow sensor.

yes

Continued on H13/H14

H11 Engine missing
Lancia Gamma i.e

Engine missing

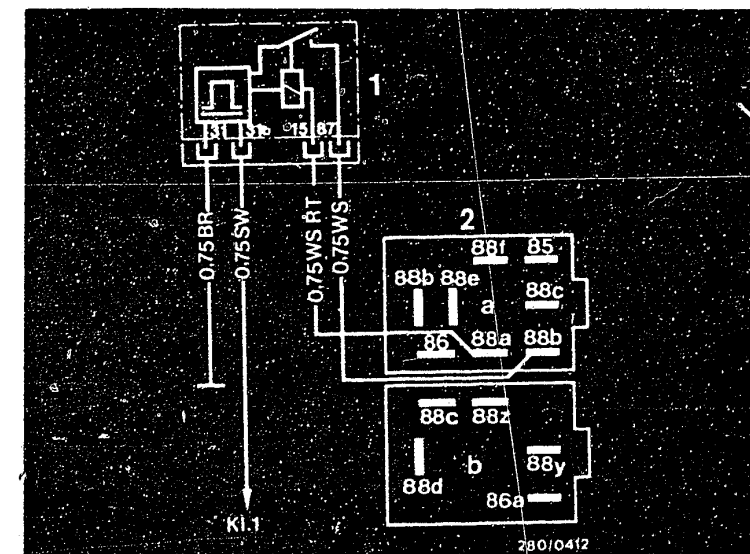
Lancia Gamma i.e.



H12	Engine missing
	Engine running

Engine missing

Lancia Gamma i.e.



1 = Fuel pump relay - Striebel
(part no. 896460)

2 = Relay set

Connection base viewed from below

a = Jetronic wiring harness

b = Vehicle wiring harness

Wiring harness - user-fabrication
(On relay set 0 332 514 105
no term. 88f)

Engine missing under all operating conditions (continued)

Injection valves checked for proper operation?

no

Connect test lead as follows:

The two-pole plug-in connections of the test lead are connected between an injection valve and its connecting lead.

Of the other two terminals of the test lead, only one terminal must be connected to the special input of the motortester.

Caution:

The other terminal must not be brought into contact with vehicle ground.

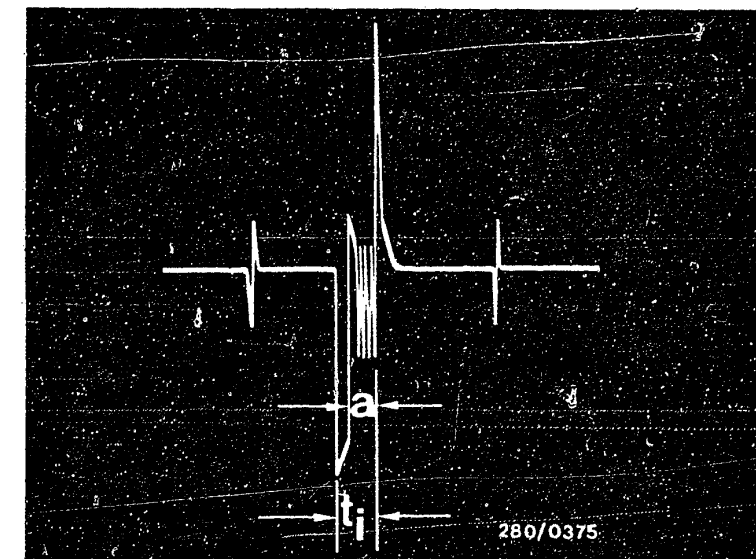
If the correct terminal is connected, the oscilloscope pattern shown opposite is visible. With the aid of the test lead it is possible to test the injection pulses at the injection valves with an ignition oscilloscope with the engine running.

If the pattern shown opposite is not obtained or if there are differences (interference, missing etc.) the other injection valves should also be tested. In case of interference, check routing of leads. If missing, remedy loose contacts in leads or in plug-in connections.

yes

Continued on H19/H20

Continued on H15/H16



Injection pulse of a current-regulated output stage (measured at the injection valve)

a = Pulse length (dependent on engine load)

tj = Injection pulse

At idle with no load on engine the current regulation a is not yet visible on the oscilloscope.

H13

Engine missing
Lancia Gamma i.e.



H14

Engine missing
Lancia Gamma i.e.

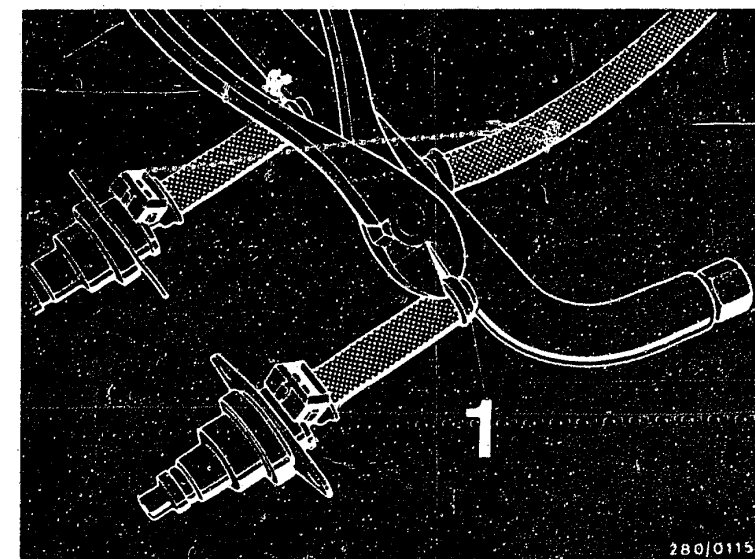


Engine missing under all operating conditions (continued)

Replacing the injection valves

Break open the hose-termination sleeves of the injection valves.

Cut open the fuel hose in the longitudinal direction with a soldering iron or soldering gun and pull off (arrow).



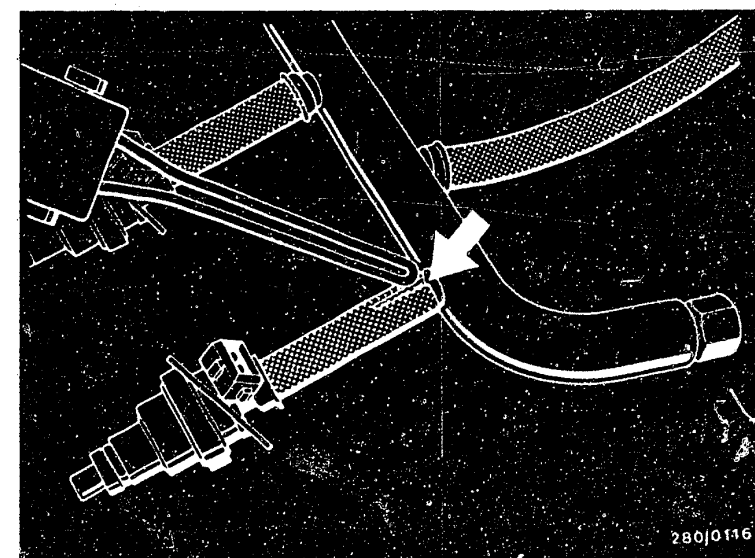
1 = Hose-termination sleeve

yes

Continued on H19/H20

yes

Continued on H17/H18



H15

Engine missing
Lancia Gamma i.e.



H16

Engine missing
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

Fit new or repaired injection valve with hose-termination sleeve. To do this, wet inside of hose with fuel and slide onto fitting as far as it will go.

Installing the injection valves

Ensure proper seating of rubber seals on each injection valve. Replace defective seals. Press all injection valves uniformly into their seats with the fuel-distribution pipes.

Important! All injection valves must be installed leak-tight.

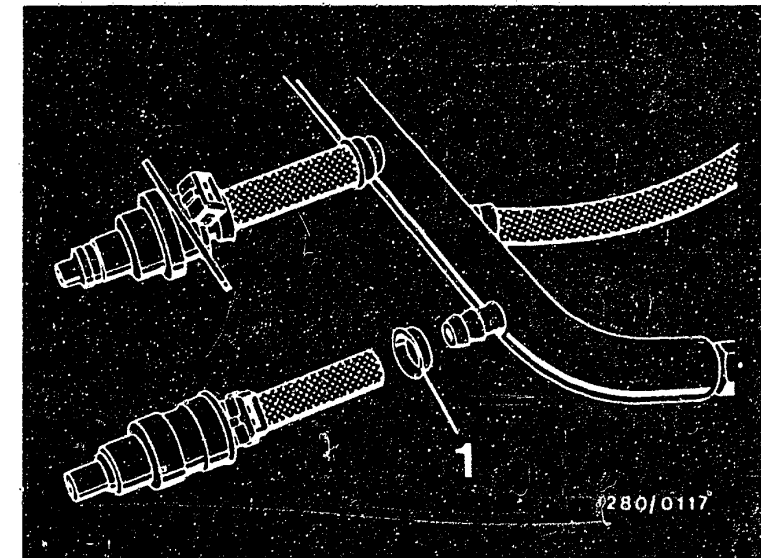
Mount fuel-distribution pipe (screw down injection valves with mounting plate on intake manifold). Also screw down central fastener and return fastener. Plug on all air/vacuum hoses. Plug on cup seals on air-flow sensor and throttle-valve assembly. Also securely tighten on auxiliary-air device, solenoid-operated air valve and crankcase breather.

Check all fuel and air hose connections once again for security.

Start engine and check whether any unmetered air is being drawn in.

yes

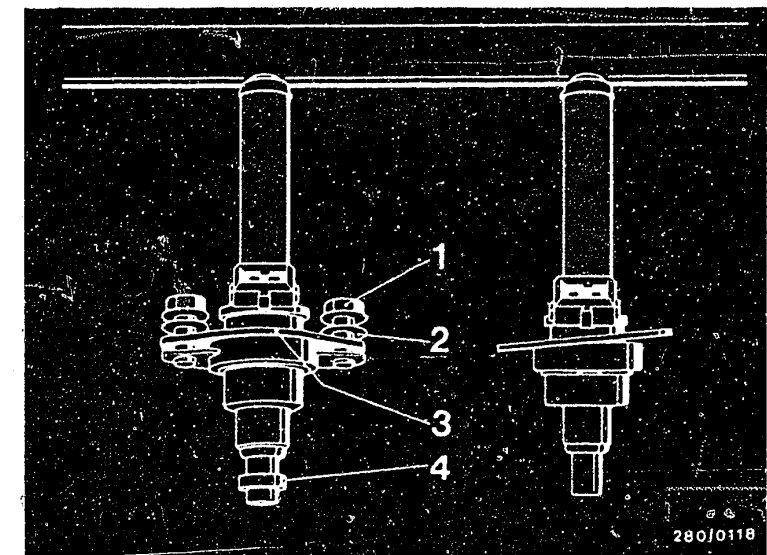
Continued on H19/H20



1 = Hose-termination sleeve

- 1 = Hexagon screw
- 2 = Washer
- 3 = Holder
- 4 = Rubber ring

} Similar on
Lancia Gamma



H17

Engine missing
Lancia Gamma i.e.



H18

Engine missing
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

Fuel delivery O.K.?

no

Measuring the fuel delivery:

For testing, undo the junction between the fuel return hose (from pressure regulator) and fuel return line (to fuel tank). If necessary, extend hose and lead into a 5 l vessel with graduated scale.

Remove air hose to air filter on air-flow sensor. Ignition "ON". Open sensor flap by hand until electric fuel pump operates.

Test specification: min. 750 cm³/30 s

Remedy if test specification not reached:

- Fuel filter clogged → Replace
- Voltage at fuel pump plugs, with engine running min. 12 V → Clean contacts; possibly also eliminate poor ground connection; replace leads
- Pressure regulator defective → Replace.
- Fuel pump delivery too low → Replace electric fuel pump.

Caution! After testing is completed, refit the hose between air filter and air-flow sensor.

yes

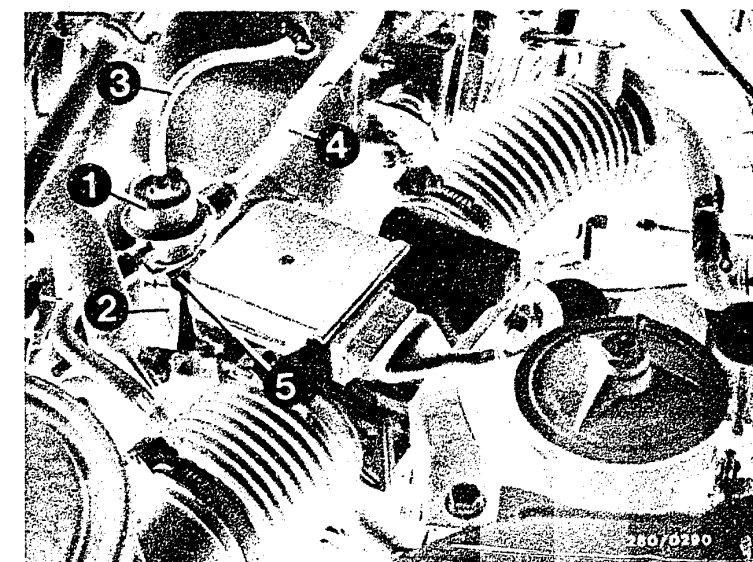
Control unit O.K.?

no

Let engine run. Shake control unit lightly and move multiple plug. Watch for engine missing. Repair plug-in connection on multiple plug or replace defective control unit.

yes

Continued on H21/H22



- 1 = Pressure regulator
2 = Fuel return line
3 = Air hose to intake manifold
4 = Fuel delivery line
5 = Support bracket

H19

Engine missing
Lancia Gamma i.e.



H20

Engine missing
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

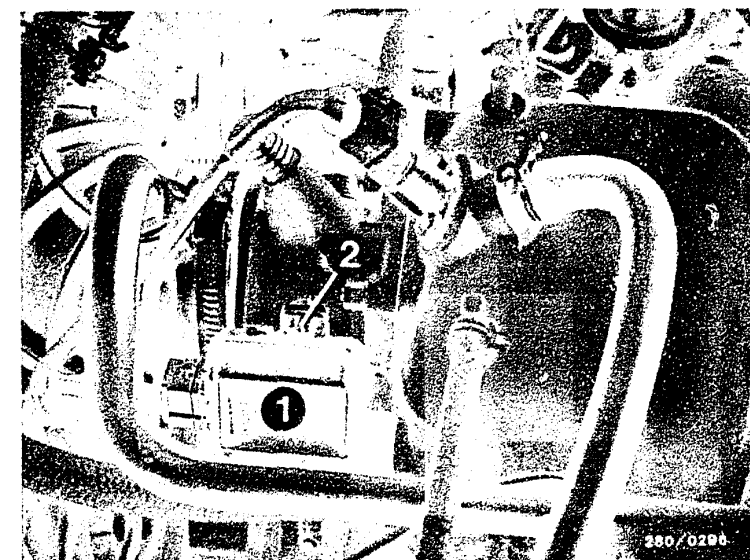
Burbling on the overrun?
Throttle valve closed?
CO and idle adjustment O.K.?

no

1. Check the exhaust system for leaks.
 2. Throttle valve closed? Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.
 3. Throttle-valve switch not adjustable.
- Trouble-shooting: Test the following leads for continuity with ohmmeter (set value approx. 0Ω):
- From multiple plug term. 2 to throttle-valve switch term. 2.
 - From throttle-valve switch term. 18 to multiple plug term. 18.
 - Measurement between term. 2 and term. 18 on throttle-valve switch. Accelerator in rest position → reading approx. 0Ω . If incorrect, replace throttle-valve switch.
 - Eliminate contact resistances in the plug-in connections.

yes

Continued on H23/H24



1 = Throttle-valve switch
2 = Fastening screws

H21

Engine missing
Lancia Gamma i.e.



H22

Engine missing
Lancia Gamma i.e.



Engine missing under all operating conditions (continued)

yes

CO and idle adjustment:

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed:

Manually-shifted transmission, automatic transmission

(Selector lever in

position P:

900 ... 1000 min⁻¹

Air conditioner off)

CO adjustment:

1.5 ... 2.5 % by vol. CO

If CO concentration too high, turn CO adjusting screw in air-flow sensor half a turn in a counter-clockwise direction (as of FD 248 with hexagon-socket-head cap screw AF 5). Test engine speed and CO concentration once again. Make corrections in several steps.

After adjusting, use new plugs.

Testing completed for customer complaint

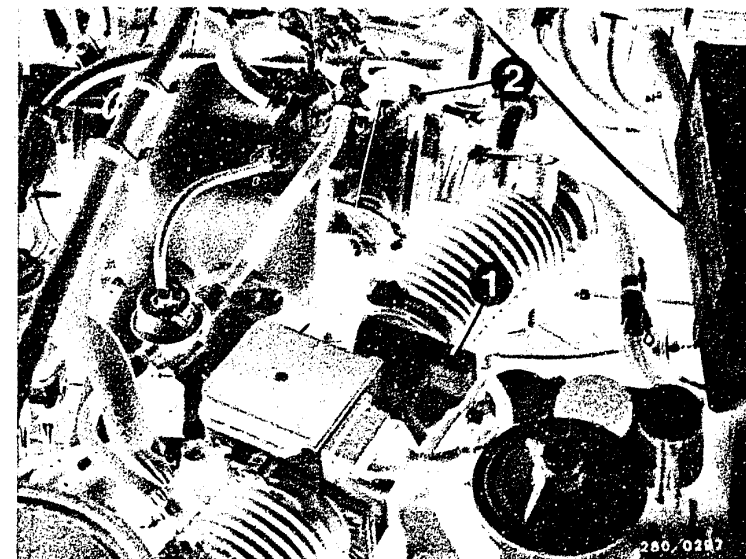
"Engine missing under all operating conditions".

Customer complaint remedied?

no

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (compression, valve setting, valve timing, worn camshaft).



1 = CO adjusting screw

2 = Idle-speed adjusting screw

H23

Engine missing
Lancia Gamma i.e.



H24

Engine missing
Lancia Gamma i.e.



FUEL CONSUMPTION TOO HIGH

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

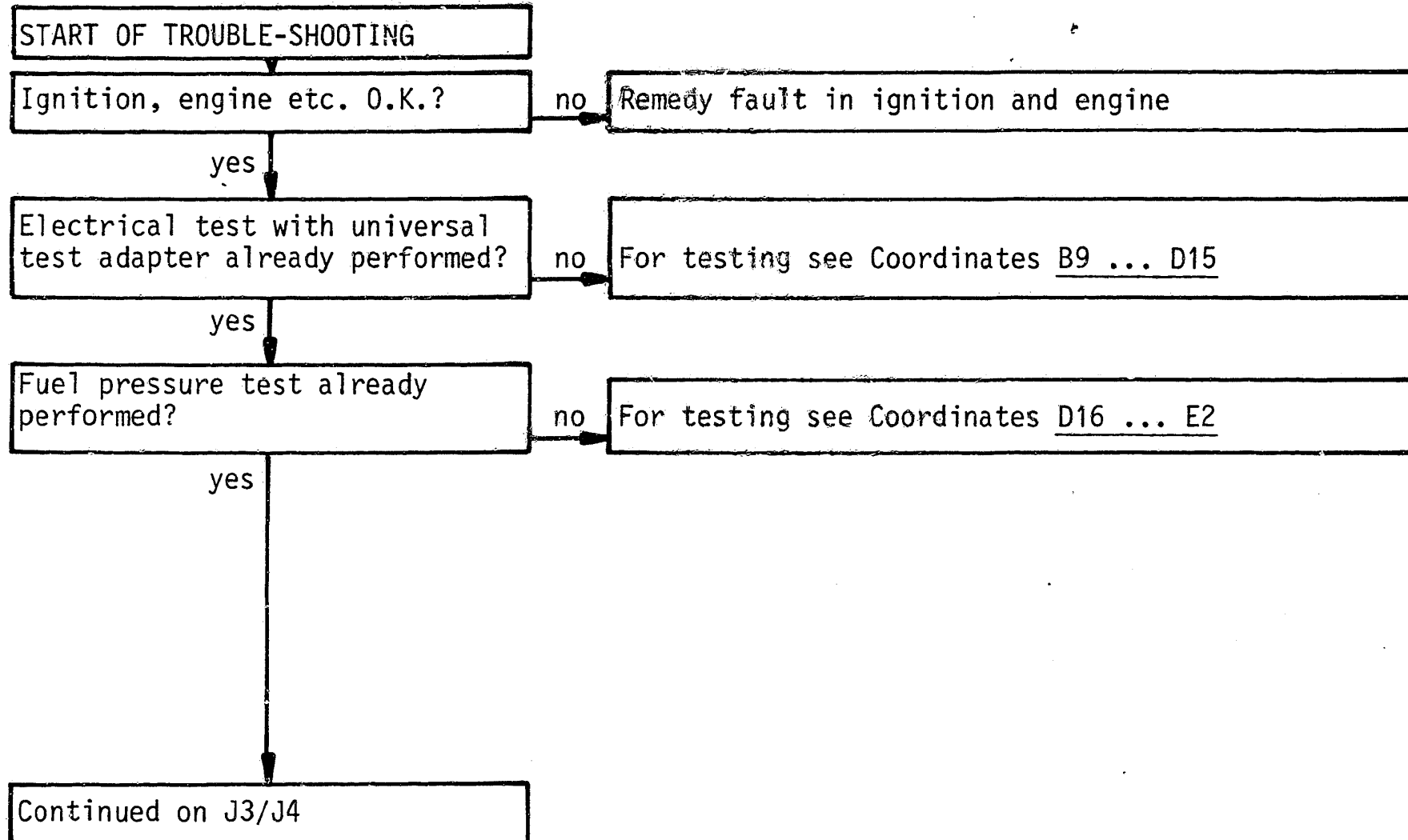
The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



J1

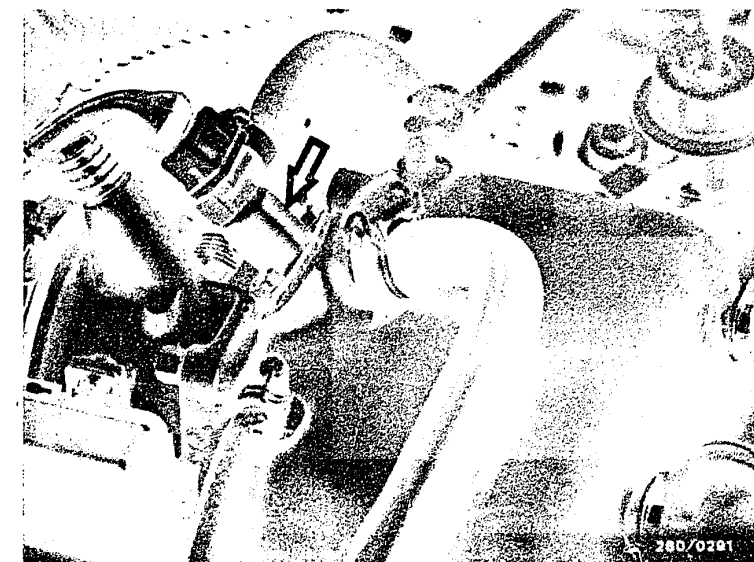
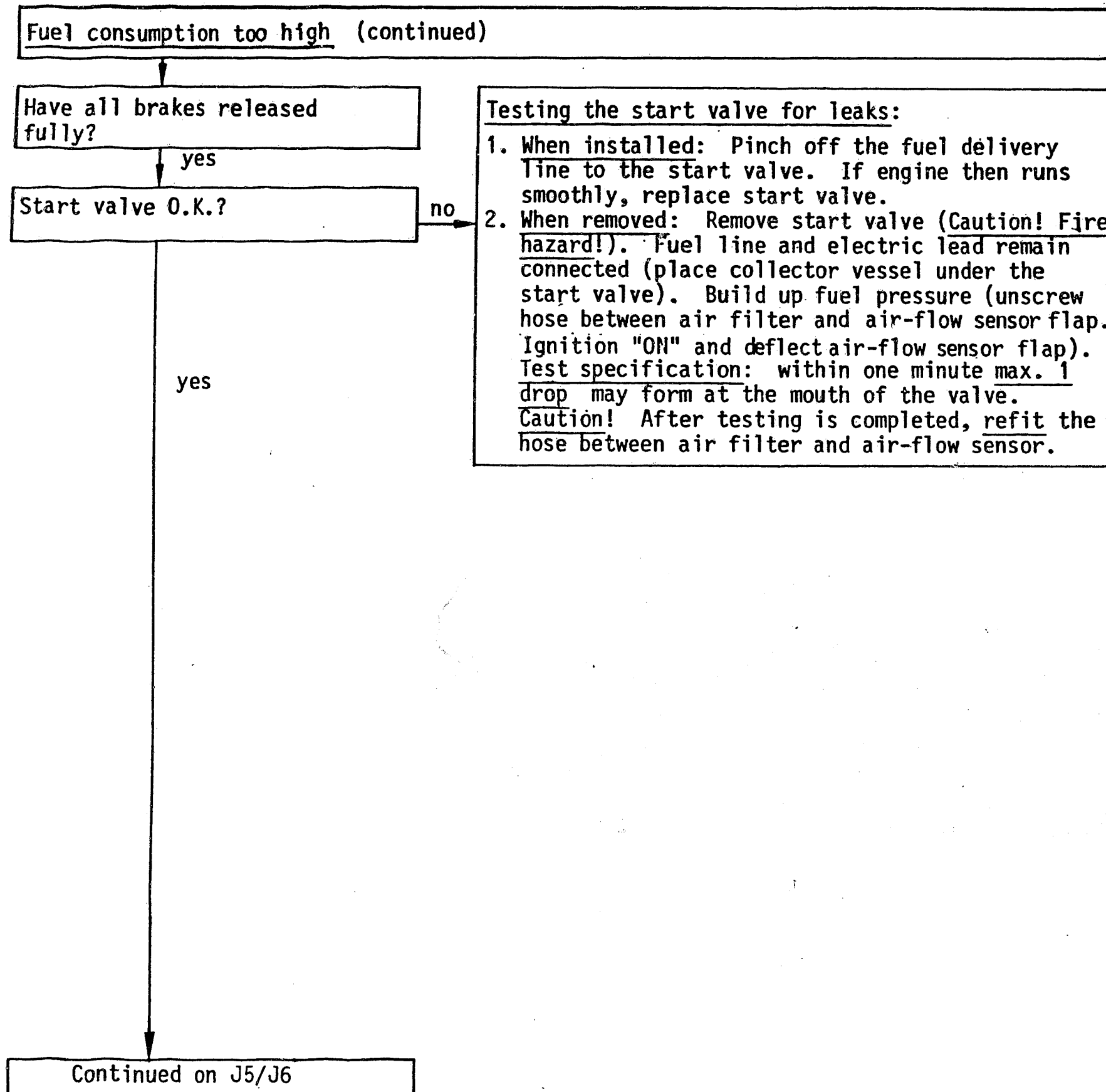
Fuel consumption too high
Lancia Gamma i.e.



J2

Fuel consumption too high
Lancia Gamma i.e.





Arrow = Start valve

J3

Fuel consumption too high
Lancia Gamma i.e.



J4

Fuel consumption too high
Lancia Gamma i.e.



Fuel consumption too high (continued)

Temperature sensors tested?

no

Testing:

Temperature sensor I measures the intake air temperature and is located in the air duct of the air-flow sensor. Measure the following values between term. 27 and term. 6 of air-flow sensor:

1. At ambient temperature (approx. +15°C...+30°C):
1.45...3.3 k Ω
2. With engine at normal op. temp. (approx. +80°C):
280...360 Ω

Make direct resistance measurement at temperature sensor II (engine) using ohmmeter. Resistance measurement at term. 13 and term. 49 (ground):

1. At ambient temperature (approx. +15°C...+30°C):
1.30...3.6 k Ω
2. With engine at normal op. temp. (approx. +80°C):
250...390 Ω

If incorrect, check for open circuit or short circuit in the following leads using ohmmeter:

Temperature sensor I:

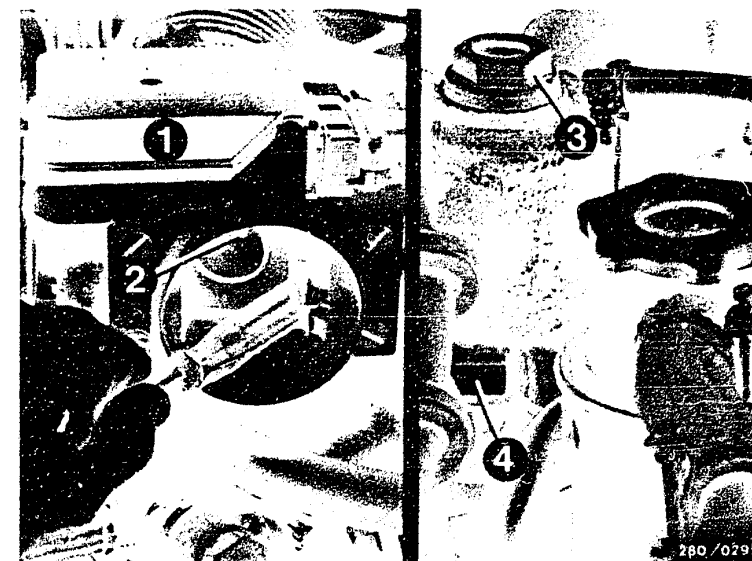
- From multiple plug term. 27 to air-flow sensor term. 27.
- From air-flow sensor term. 6 to multiple plug term. 6

Temperature sensor II:

- From multiple plug term. 13 to temperature sensor II term. 13.
- From temperature sensor II term. 49 to central ground (lead 49). Check all contacts in the plug-in connections.

yes

Continued on J7/J8



- 1 = Air-flow sensor
- 2 = Temperature sensor I
- 3 = Coolant bleeder screw
- 4 = Temperature sensor II (white plug)

J5

Fuel consumption too high
Lancia Gamma i.e.



J6

Fuel consumption too high
Lancia Gamma i.e.



Fuel consumption too high (Continued)

Injection valves mechanically O.K.?

No

With the engine running, detach injection-valve connectors individually, one after the other, from the injection valves and plug on again. Engine speed must drop if injection valve O.K. Test for continuity in connecting leads from relay set term. 88b, term. 88e via the injection valves to control unit term. 14, 15, 32 and 33. If necessary, replace leads or injection valves.

Yes

Air-flow sensor O.K.?

No

The air-flow sensor is secured on a bracket with 3 screws.

Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

Test specification: 100...500 Ω

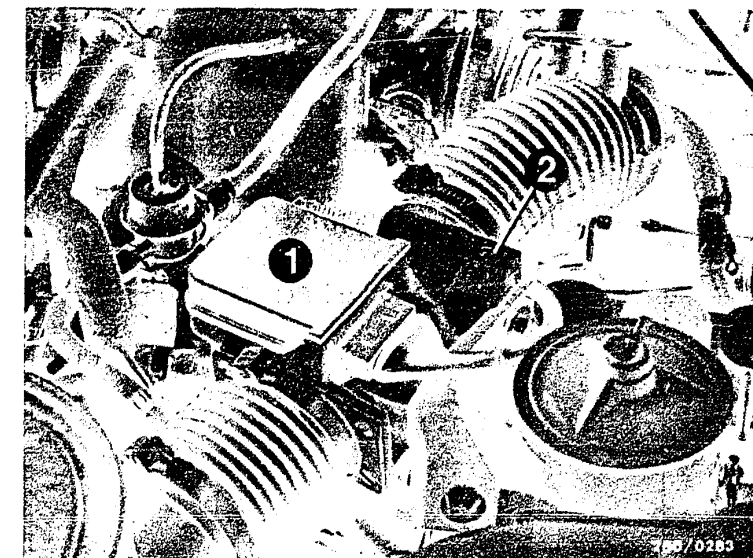
as of FD 049: 200...1000 Ω

Caution!

After testing is completed, refit pipe-piece between air filter and air-flow sensor.

Yes

Continued on J9/J10



1 = Air-flow sensor

2 = CO adjusting screw

Turning in clockwise direction = richer mixture

J7

Fuel consumption too high

Lancia Gamma i.e.



J8

Fuel consumption too high

Lancia Gamma i.e.



Fuel consumption too high (continued)

CO and engine speed correctly adjusted?

no

CO and idle adjustment:

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed:

Manually-shifted transmission, automatic transmission

(Selector lever in

position P: 900 ... 1000 min⁻¹

Air conditioner off)

CO adjustment: 1.5 ... 2.5 % by vol. CO

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Test idle speed and CO concentration again (as of FD 248 with hexagon-socket-head cap screw AF 5). Make corrections in several steps. After adjusting, use new plugs.

yes

Can engine speed not be adjusted?

yes

Testing completed for customer complaint

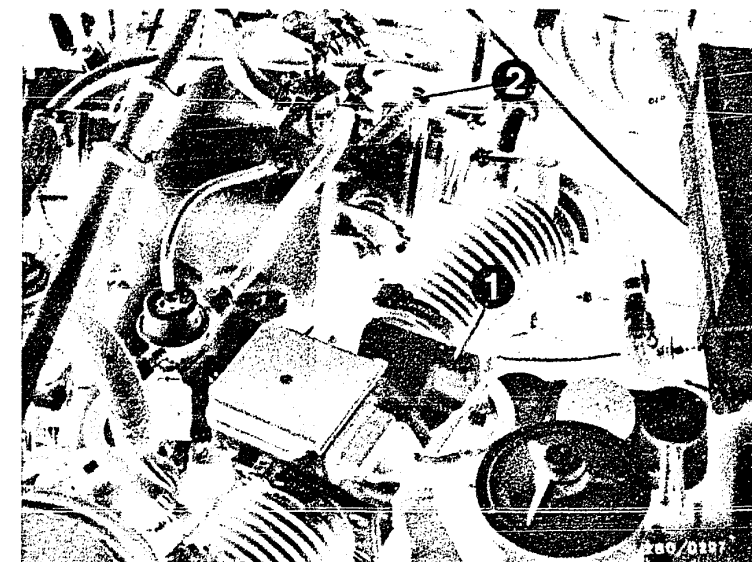
"Fuel consumption too high"

Customer complaint remedied?

no

Further possibilities:

- Customer complaint incorrectly diagnosed (See Coordinates B 3...B 8).
If the fault has not been detected by "Direct trouble-shooting", see "Detailed trouble-shooting" (Coordinates B 3/B 4).
- Engine not mechanically O.K.
(Compression, valve setting, valve timing, worn camshaft)



1 = CO adjusting screw

2 = Idle-speed adjusting screw

J9

Fuel consumption too high

Lancia Gamma i.e.



J10

Fuel consumption too high

Lancia Gamma i.e.



MAXIMUM ENGINE POWER/TOP SPEED NOT REACHED

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

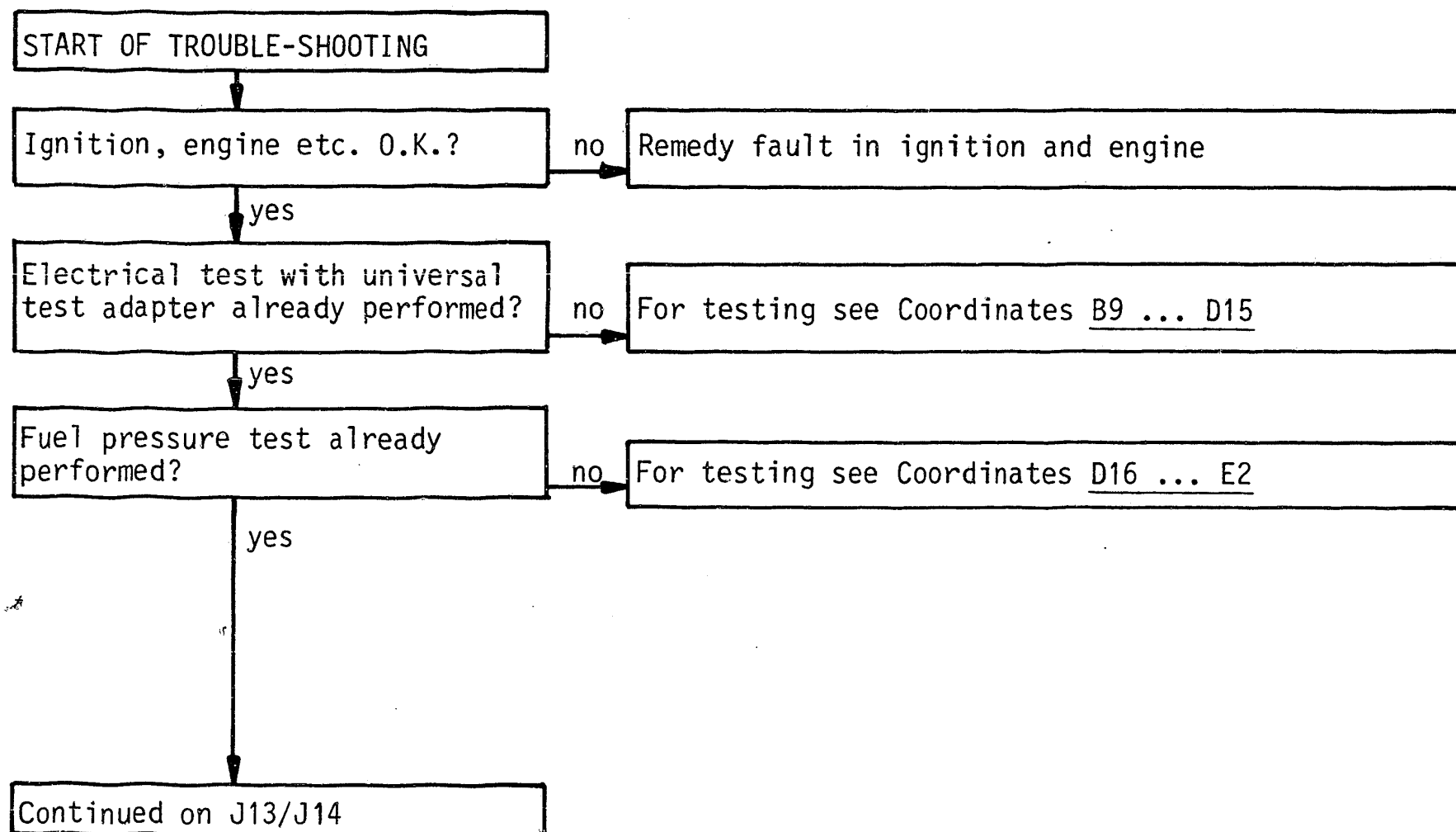
The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



J11

Maximum engine power not reached
Lancia Gamma i.e.



J12

Maximum engine power not reached
Lancia Gamma i.e.



No maximum engine power, top speed not reached (continued)

Does throttle valve open fully?

no

Throttle linkage, accelerator pedal O.K.?
Straighten linkage if necessary. Throttle linkage may stick due to floor mat etc.
Check plug-in connection on throttle-valve switch and control unit.

Testing:

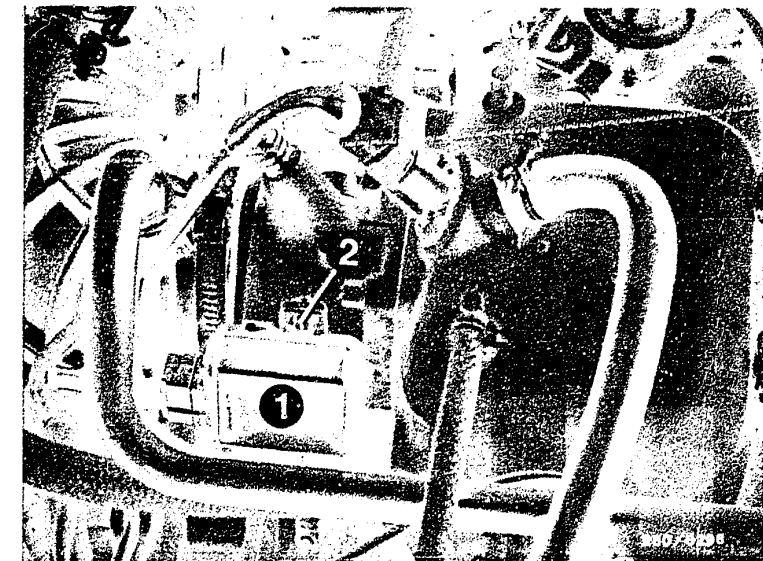
Open the throttle valve fully. (Completely depress accelerator). Connect ohmmeter to term. 3 and term. 18 on throttle-valve switch (set value: approx. 0 Ω).

If reading differs, replace throttle-valve switch. If the fault is still not remedied, check the following leads for continuity using ohmmeter (set value 0 Ω):

From throttle-valve switch term. 3 to control unit term. 3. From throttle-valve switch term. 18 to control unit term. 18.

yes

Continued on J15/J16



1 = Throttle-valve switch
2 = Fastening screws

J13

No maximum engine power
Lancia Gamma i.e.



J14

No maximum engine power
Lancia Gamma i.e.



No maximum engine power, top speed not reached (continued)

Throttle-valve switch O.K.?
(Full-load enrichment)

Control unit O.K.?

no

Connect test lead as follows:

The two-pole plug-in connections of the test lead are connected between an injection valve and its connecting lead.

Of the other two terminals of the test lead, only one terminal must be connected to the special input of the motortester.

Caution:

The other terminal must not be brought into contact with vehicle ground.

If the correct terminal is connected, the oscilloscope pattern shown opposite is visible. With the aid of the test lead it is possible to test the injection pulses at the injection valves with an ignition oscilloscope with the engine running.

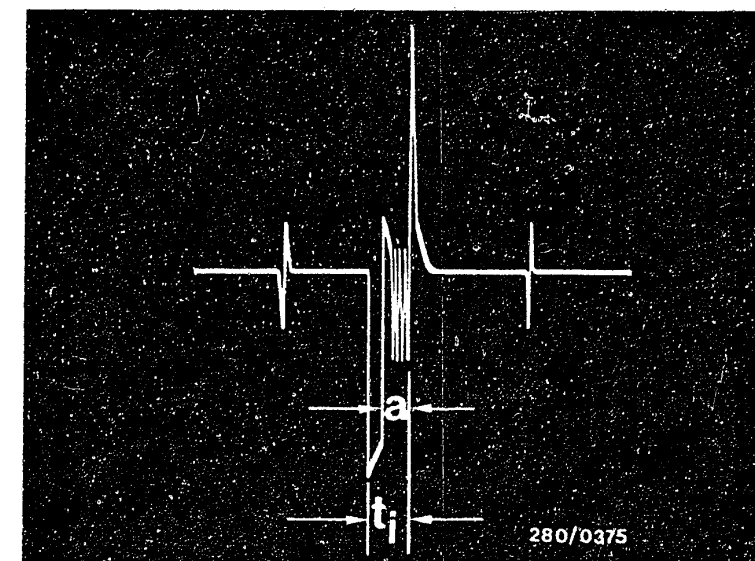
Observe the injection pulses at idle. Remove the throttle-valve switch plug and bridge term. 3 and term. 18 (using insulated wire).

Caution!

Do not bend terminals. Injection pulse must become longer. If not: Test connecting leads from multiple plug to throttle-valve switch (term. 3 and term. 18) for continuity. If O.K., replace control unit.

yes

Continued on J17/J18



Injection pulse of a current-regulated output stage (measured at the injection valve)

a = Pulse length (dependent on engine load)

t_j = Injection pulse

At idle with no load on engine the current regulation a is not yet visible on the oscilloscope.

J15

No maximum engine power

Lancia Gamma i.e.



J16

No maximum engine power

Lancia Gamma i.e.



No maximum engine power, top speed not reached (Continued)

Fuel delivery O.K.?

Yes

Continued on J19/J20

No

Measuring the fuel delivery:

For testing, undo the junction between the fuel return hose (from pressure regulator) and fuel return line (to fuel tank). If necessary, extend hose and lead into a 5 l vessel with graduated scale.

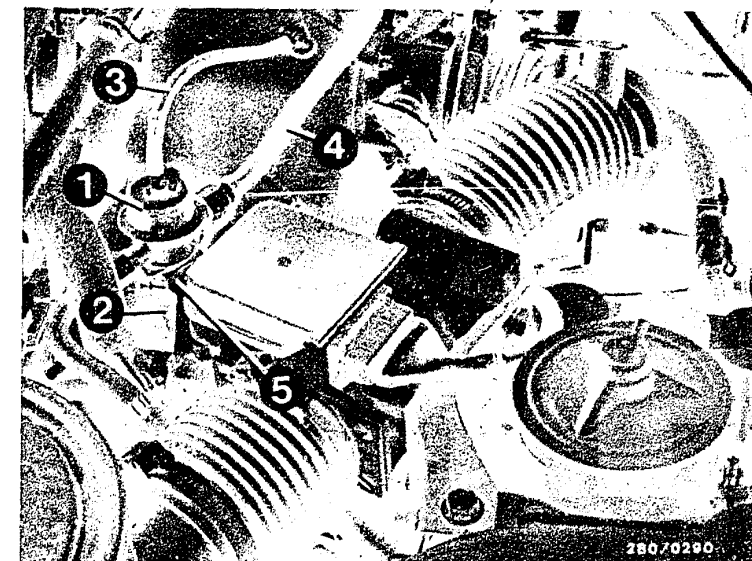
Remove air hose to air filter on air-flow sensor. Ignition "ON". Open sensor flap by hand until electric fuel pump operates.

Test specification: min. 750 cm³/30 s

Remedy if test specification not reached:

- Fuel filter clogged → Replace
- Voltage at fuel pump plugs, with engine running min. 12 V → Clean contacts; possibly also eliminate poor ground connection; replace leads
- Pressure regulator defective → Replace.
- Fuel pump delivery too low → Replace electric fuel pump.

Caution! After testing is completed, refit the hose between air filter and air-flow sensor.



- 1 = Pressure regulator
2 = Fuel return line
3 = Air hose to intake manifold
4 = Fuel delivery line
5 = Support bracket

J17

No maximum engine power
Lancia Gamma i.e.



J18

No maximum engine power
Lancia Gamma i.e.



No maximum engine power, top speed not reached (continued)

Air-flow sensor O.K.?

no

The air-flow sensor is secured on a bracket with 3 screws.

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

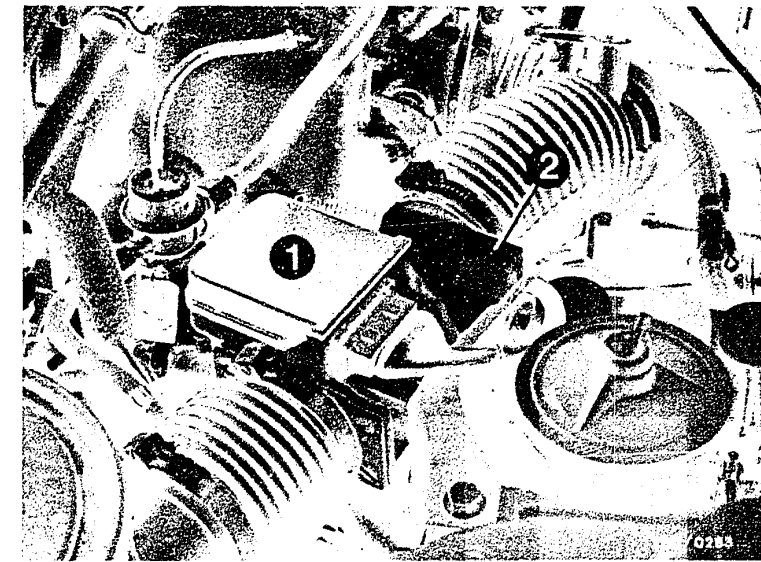
Test specification: $100...500\ \Omega$
as of FD 049 $200...1000\ \Omega$

Potentiometer test: (noise test):

Remove air-flow sensor. (Loosen hose clamps on both sides of air-flow sensor. Loosen air-flow sensor fastening screws; leave plug on). Set motortester to special input and connect with special cable to air-flow sensor term. 7 (red clip) and term. 6 (black clip).

yes

Continued on J21/J22



1 = Air-flow sensor

2 = CO adjusting screw

Turning in clockwise direction =
richer mixture

J19

No maximum engine power
Lancia Gamma i.e.



J20

No maximum engine power
Lancia Gamma i.e.



No maximum engine power, top speed not reached (continued)

Are all hose lines and electric leads securely connected? Visual examination. Is the air-intake system leak-tight?

no

Check whether hoses of air-intake system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by re-tightening the connecting screws.

Leak test:

Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose contacts.

yes

Testing completed for customer complaint

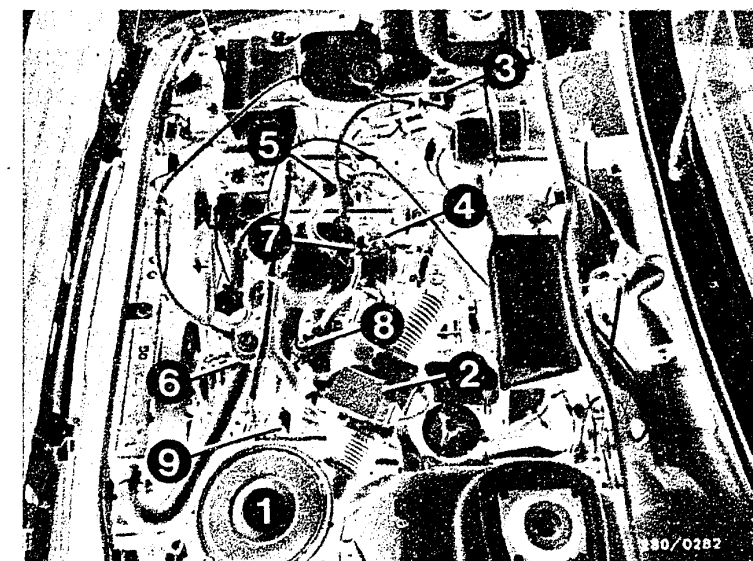
"Maximum engine power/top speed not reached".

Customer complaint remedied?

no

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (compression, valve setting, valve timing, worn camshaft).



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Relay set
- 4 = Throttle-valve switch
- 5 = Auxiliary-air device (black plug)
- 6 = Temperature sensor II (white plug)
Thermo-time switch (brown plug)
- 7 = Start valve
- 8 = Pressure regulator
- 9 = Injection valve

J21

No maximum engine power
Lancia Gamma i.e.



J22

No maximum engine power
Lancia Gamma i.e.



IDLE SPEED AND CO CONCENTRATION TOO LOW OR TOO HIGH

Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

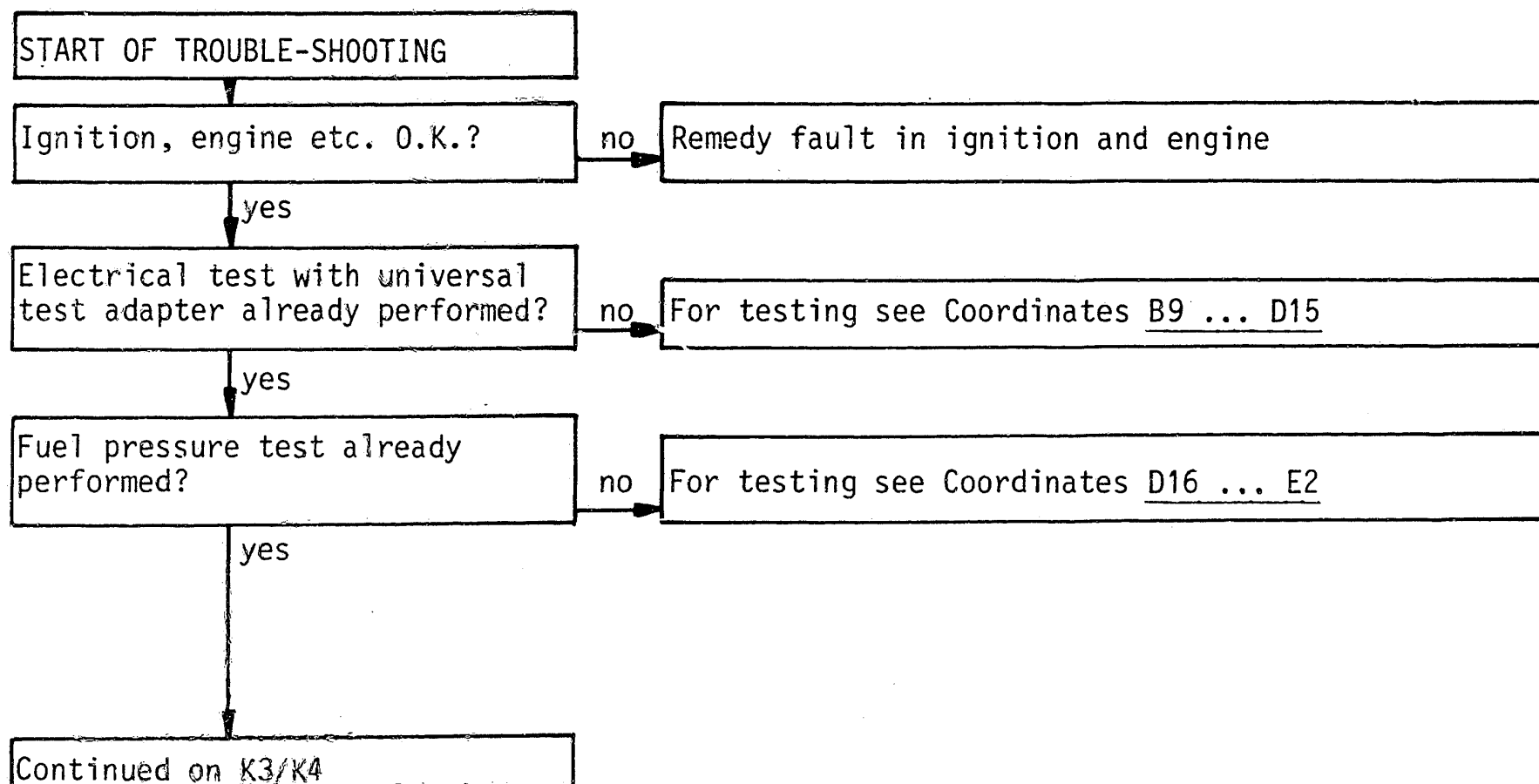
The program is divided into three rows of boxes:

- The left-hand row contains the questions on the tests.
- The middle row contains descriptions of the testing and adjustment operations on the components.
- The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.

**K1**

Idle speed and CO adjustment
Lancia Gamma i.e.

**K2**

Idle speed and CO adjustment
Lancia Gamma i.e.



CO adjustment at idle too low or too high (continued)

CO and idle speed correctly adjusted?

no

CO and idle adjustment:

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed:

Manually-shifted transmission, automatic transmission

(Selector lever in position P:

900 ... 1000 min⁻¹

Air conditioner off)

CO adjustment:

1.5 ... 2.5 % by vol. CO

If CO concentration too high, turn CO adjusting screw in air-flow sensor half a turn in a counter-clockwise direction (as of FD 248 with hexagon-socket-head cap screw AF 5). Test engine speed and CO concentration once again. Make corrections in several steps.

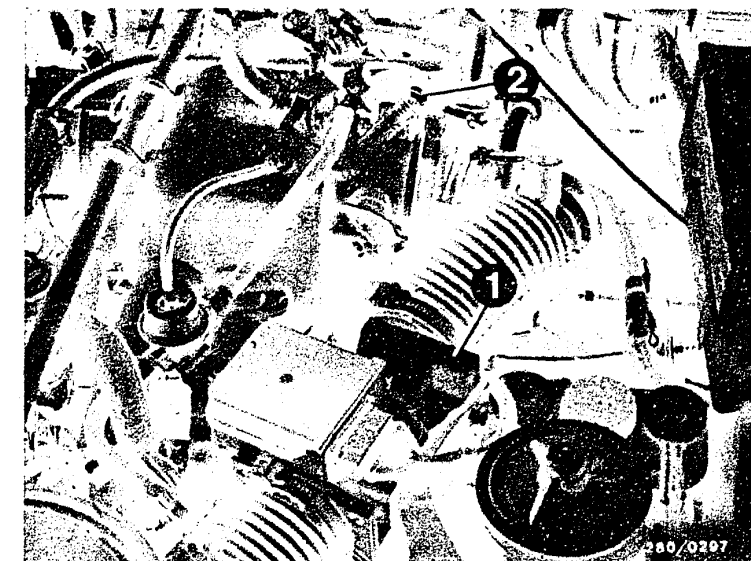
After adjusting, use new plugs.

yes

Can idle speed not be adjusted?

yes

Continued on K5/K6



1 = CO adjusting screw

2 = Idle-speed adjusting screw

K3

CO adjustment

Lancia Gamma i.e.



K4

CO adjustment

Lancia Gamma i.e.



CO adjustment at idle too low or too high (continued)

Air-flow sensor O.K. ?

no

The air-flow sensor is secured on a bracket by 3 screws.

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor.

Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

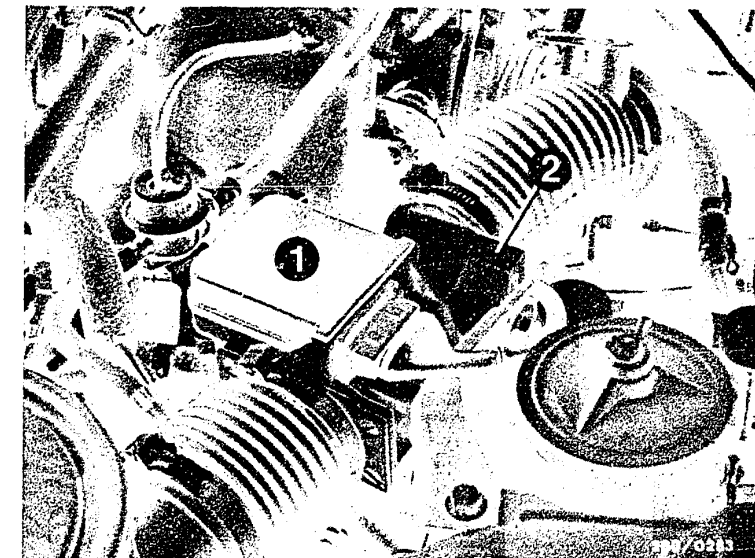
Test specification: $\frac{100...500 \Omega}{200...1000 \Omega}$
as of FD 049

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.

yes

Continued on K7/K8



1 = Air-flow sensor

2 = CO adjusting screw

Turning in clockwise direction
= richer mixture

K5

CO adjustment

Lancia Gamma i.e.



K6

CO adjustment

Lancia Gamma i.e.



CO adjustment at idle too low or too high (continued)

CO concentration below tolerance?

max. 2.5 % by vol. CO

Temperature sensors O.K.?
Start valve leak-tight?

No

Testing the temperature sensor:

Using ohmmeter, make direct resistance measurement at temperature sensor II (engine). Resistance measurement at term. 13 and term. 49 (ground);

1. Ambient temperature (approx. +15°C...+30°C) 1.30...3.6 k Ω
2. Engine at normal op. temp. (approx. +80°C): 250...390 Ω

If incorrect, check for open circuit or short circuit in following leads using ohmmeter: Multiple plug term. 13 to temperature sensor II term. 13 and temperature sensor II term. 49 to central ground (lead 49). Check all contacts in the plug-in connections.

Testing the start valve:

Testing the start valve for leaks:

1. When installed

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed

Remove start valve (Caution! Fire Hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (remove hose between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

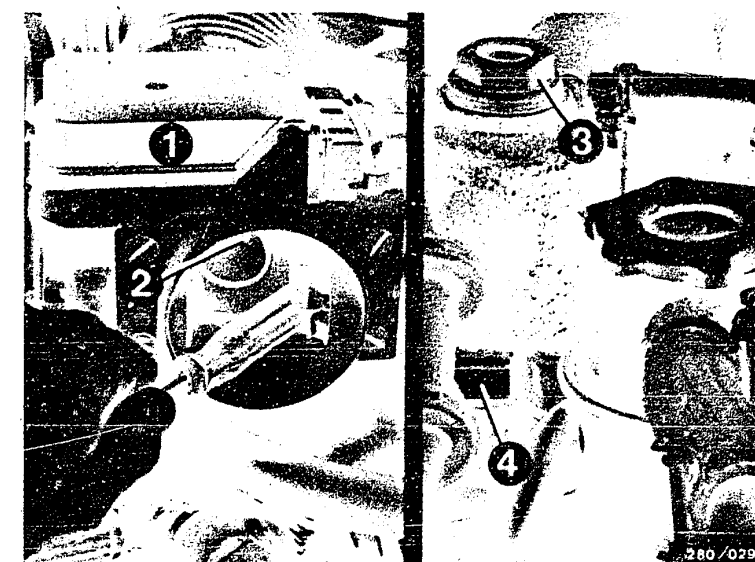
Test specification: Within one minute max. 1 drop may form at the mouth of the valve.

Caution! After the test is completed, the hose between air filter and air-flow sensor must be fitted again. Make sure the hose clamp is tight.

Yes

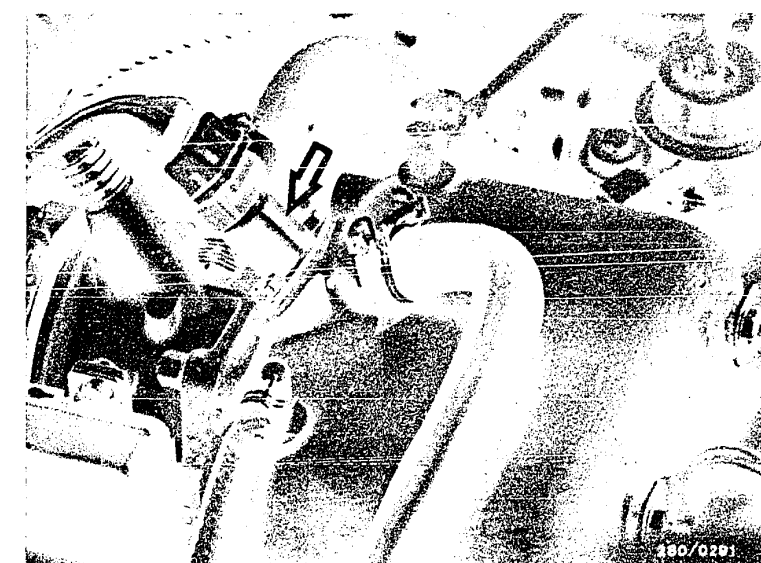
Continued on K11/K12

Continued on K9/K10



- 1 = Air-flow sensor
- 2 = Temperature sensor I
- 3 = Coolant bleeder screw
- 4 = Temperature sensor II (engine), white plug

Arrow = Start valve



K7

CO adjustment
Lancia Gamma i.e.



K8

CO adjustment
Lancia Gamma i.e.



CO adjustment at idle too low or too high (continued)

Test specification:

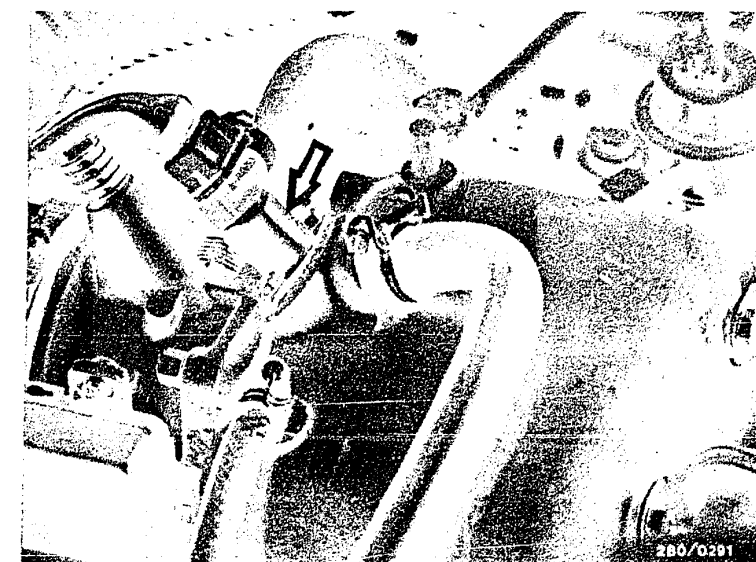
Within one minute max. 1 drop may form at the mouth of the valve.

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.

yes

Continued on K11/K12



Arrow = Start valve

K9

CO adjustment

Lancia Gamma i.e.

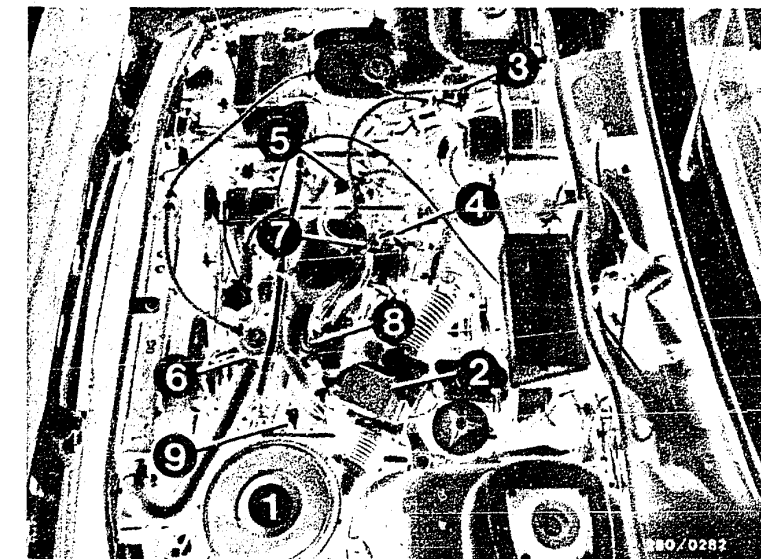
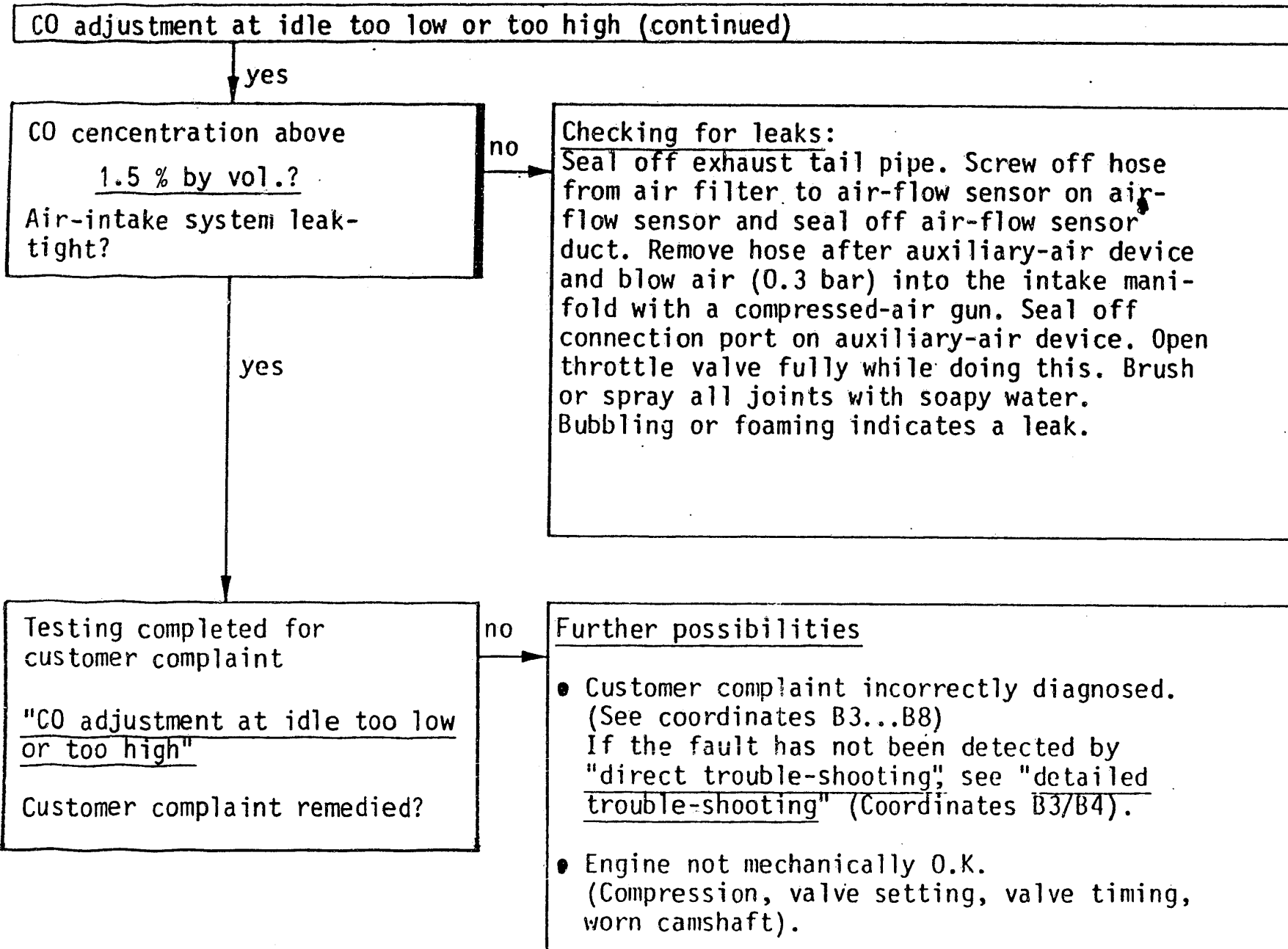


K10

CO adjustment

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- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Relay set
- 4 = Throttle-valve switch
- 5 = Auxiliary-air device (black plug)
- 6 = Temperature sensor II (white plug)
Thermo-time switch (brown plug)
- 7 = Start valve
- 8 = Pressure regulator
- 9 = Injection valve



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NEW RELAY SET FOR L-JETRONIC

Connection sockets, danger of confusion

VDT-I-280/104 En

9.1980

New relay combinations 0 332 514 121, ..123, ..124, ..125 and ..127 with black plastic housing are being fitted in L-Jetronic equipped vehicles (e.g. BMW and FIAT).

With these new relay combinations, the two connection sockets can be accidentally confused with one another (for instance during test work). The safeguard pin previously fitted in terminal 88f of the Jetronic wiring harness socket of the relay combination 0 332 514 105 has been omitted and replaced by a "genuine" terminal 88f (see Figs. 1 and 2).

Fig. 1

Layout of the conductors in the connection socket of the relay combination 0 332 514 105 (top view)

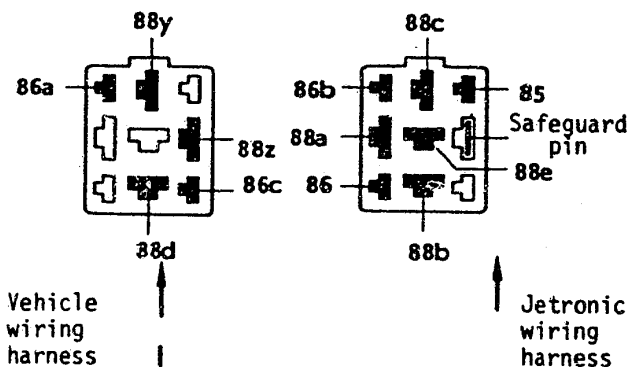
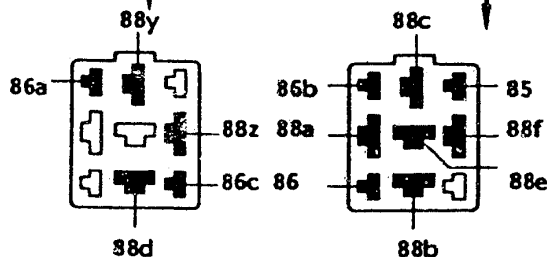


Fig. 2

Layout of the conductors in the connection socket of the relay combinations 0 332 514 121, ..123, ..124, ..125, ..127 (top view)



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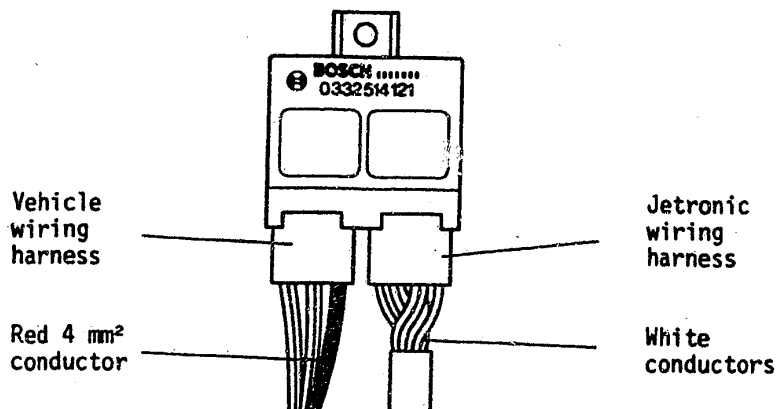


The connection sockets can also be identified in the following manner:

Vehicle wiring harness - connection socket is recognizable by the thick red conductor (4 mm²) leading to terminal 88Z. As viewed from above it is located on the left of the relay combination (see Fig. 3).

Jetronic wiring harness - connection socket is recognized by the white conductors. As viewed from above it is located on the right of the relay combination (see Fig. 3).

Note: With the wiring-harness sockets interchanged, the electric fuel pump starts to run as soon as the ignition is switched on.



With the introduction of the new relay combination, the resistance value between terminal 86b and 85 changes to 70 ... 500 Ω (L-Jetronic Tester, test step 3.1).

When testing with an ohmmeter, observe correct polarity.

Positive pole of the ohmmeter to terminal 86b.



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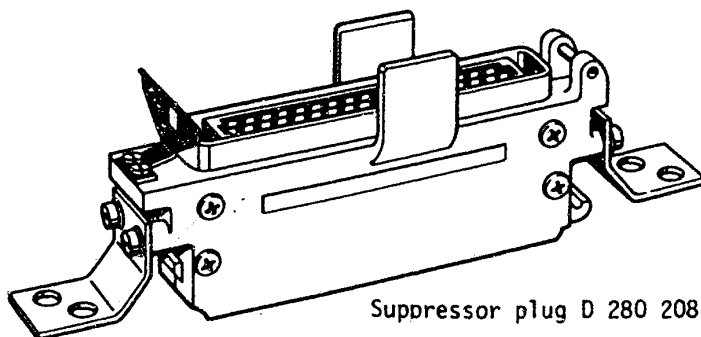
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PERMANENTLY INSTALLED AND PORTABLE TRANSMITTER
INSTALLATIONS FITTED IN VEHICLES EQUIPPED WITH
L-JETRONIC

VDT-I-280/106 En
4.1981

If, in vehicles equipped with L-Jetronic and in which transmitter installations are operated, whether permanently installed or removable and portable, malfunctions occur whilst the vehicle is being driven (the engine shakes or stops etc.), the following measures can be taken to remedy these faults:

- The hinges for the engine hood and the luggage-compartment lid are to be bridged with a flexible copper braided grounding strip (efficient grounding!).
- The antenna base is to be connected to the vehicle chassis using a copper grounding strip to ensure clean, 100% connection.
- Locate the transmitter and its antenna as far away as possible from the L-Jetronic control unit.
- Tune the transmitter to the antenna in order to achieve the minimum reflection coefficient.
- The parallel routing of the cables for the transmitter power supply and the antenna with the L-Jetronic wiring harness is to be avoided (danger of cross-coupling and cross-talk).



Suppressor plug D 280 208 091

If the disturbances and complaints continue even though the above measures have been taken, then the degree of suppression can be improved by incorporating the suppression plug D 280 208 091 between the wiring-harness plug and the L-Jetronic control unit.

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Ordering

REGE/AV is to order direct from KH/VKD2.

Price

Available upon request.

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DETERMINATION OF THE TEMPERATURE VALUES
GIVEN IN L-JETRONIC MANUALS

VDT-I-280/108 En
5.1982

We have recently been asked with increasing regularity how accurately the engine temperature must be measured when trouble-shooting on the vehicle.

So far in its L-Jetronic manuals KH/VSK has given three or four different temperatures for testing the temperature sensor:

-10 °C, +20 °C, +40 °C and +80 °C,

and two ranges for the thermo-time switch e.g. 35 °C 8 sec.

below +30 °C and above +40 °C.

Since the temperature range need not be subject to such close tolerances, we propose in future the following more appropriate definition:

- Ambient temperature (approx. +15 °C to +30 °C)
- Engine at normal operating temperature (approx. +80 °C).

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PLUG-AND-SOCKET CONNECTORS FOR JETRONIC COMPONENTS

Parts sets

VDT-I-280/111 En

11.1982

(Replaces Ed. 7.82)

Parts sets are available for replacement Jetronic plug-and-socket connectors. The parts sets comprise:

- Connector housing
- Protective cap (rubber sleeve)
- Contact springs

These parts sets are listed on microfiche EE...*.

* See microfiche EE00 under 0 280 ..

- Plug, black, 2-pin, parts set 1 287 013 002 cable connector in conjunction with socket, 2-pin

- Socket, black, 2-pin, parts set 1 287 013 001 for e.g.:

Temperature sensor	0 280 130 0..
Auxiliary-air device	0 280 140 ..
Thermo-time switch	0 280 130 2..
Start valve	0 280 170 ..
Warm-up regulator	0 438 140 ..

- Socket, grey, 2-pin, parts set 1 287 013 003 for:

Solenoid-operated injection valve 0 280 150 ..

- Socket, black, 3-pin, parts set 1 237 000 039 for:

Throttle-valve switch 0 280 120 ..

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- Socket, black, 5-pin, parts set 1 287 013 066 for
Air-flow sensor 0 280 20. ... (LE-Jetronic)
- Socket, black, 6-pin, parts set 1 287 013 004 for
Air-flow sensor 0 280 200 ...
- Socket, black, 7-pin, parts set 1 287 013 005 for
Air-flow sensor 0 280 20. ...
Air-flow sensor 0 280 211 ...

The contact springs (minitimer) can also be supplied separately under Part No. 1 284 477 026.

The connector housings are only available in the stated colours.

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Parts Cleaning

Use of highly-inflammable cleaning agents, or cleaning agents which are dangerous to health

Gen.

VDT-I-Gen./18 En
7.1978

When cleaning parts which come from vehicle electrical products prior to repair, it is permitted to use the following cleaning agents: Benzine, trichloethylene (tri) and perchloroethylene (per). These are dangerous, and must be handled with appropriate care. The relevant safety regulations in West Germany are:

Regulations concerning work with inflammable liquids
(VbF) issued by the Federal Labor Ministry (BmA).

Safety regulations for the use of chlorinated hydrocarbons
as applied to the works ZH1/222
as applied to personnel ZH1/119

as issued by the Federation of the Trade co-operative Associations
(Central Association for Accident Prevention and Industrial Medicine):
Langartweg 103, D-5300 Bonn 5).

1. Benzine, acetone and ethanol (ethyl alcohol) are inflammable liquids and their mixtures with air are dangerous due to the risk of explosion. Parts washing may only take place in tanks or containers solely intended for this purpose and equipped with a "melt" safety device for the lid which, in case the liquid catches fire, causes the lid to close automatically and smother the fire. In the case of larger containers (exceeding 500 x 500mm) some form of suction extraction must be provided.
- 1.1 Generators, alternators, wiper motors, small-power motors and other electrical equipment for installation in vehicles are, in ever increasing numbers, being equipped with capacitors having long storage times (e.g. for interference-suppression purposes in radio-receiver or transmitter installations).

When washing such parts, it is possible that a capacitor discharge can occur when the part is immersed in the cleaning agent. This can lead to an inflammable liquid catching fire. For this reason, parts on which a capacitor is fitted are only to be washed in trichloethylene (tri) or perchloroethylene (per).

- 1.2 In the case of starting motors, it has already been pointed out in earlier repair instructions that the parts should be thoroughly dried after washing in benzine, this applies particularly to windings. With sliding-gear starting motors, the first test run after washing out must be performed without the closure cap in order to avoid the possibility of explosion.

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2. Trichloroethylene (tri) and perchloroethylene (per) are both liquids whose vapors have a stupefying effect, and which are dangerous to health if inhaled over long periods. Tri vapor is heavier than air, and therefore especially dangerous at floor level. Gloves and goggles are to be worn when washing out parts in these liquids.

If cleaning of parts is carried out regularly, or continuously, in trichloroethylene only containers or tanks intended solely for this purpose are to be used, and the suction extraction device is to be switched on. When washing parts do not bend over the container.



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HOT-STARTING PROBLEMS

VDT-I-Gen. 050 En

on vehicles fitted with Jetronic

9.1982

Customer complaints

If the vehicle is parked and the engine switched off after having been run at normal operating temperature, it often occurs that the engine proves difficult to start, or won't start at all, and when it does start it runs extremely roughly (only on 2 or 3 cylinders). The engine has to be accelerated a number of times before it runs smoothly.

Causes

For economic reasons ("stretching" of the mineral-oil reserves), it can happen that alcohol in varying quantities has been added to gasoline. Methanol is used for instance.

Such alcohol-added fuels, depending upon the amount of alcohol, adversely affect the hot-starting characteristics of the engine. The addition of alcohol raises the vapor pressure of the fuel and the result is that the boiling point of the alcohol-fuel mixture drops. This in turn leads to the formation of fuel-vapor locks in the fuel system when the engine has been switched off.

This means that when starting, and during the subsequent idle period, the air-fuel mixture is temporarily too lean.

Remedies

- Check the ignition and Jetronic systems, particularly for leaks.
- Changing to another brand of gasoline can sometimes cure the problem immediately.
- In many cases, fully depressing the gas pedal helps during starting, as does slightly depressing the gas pedal during the idle period until the engine runs smoothly.
- Fit the pulse relay 0 340 000 003 (refer also to VDT-I-438/105) in vehicles with K and D-Jetronic.
This step, though, will still not fully alleviate the rough running of the engine during the starting off phase

Note:

The pulse relay 0 340 000 003 is NOT to be installed in vehicles fitted with L-Jetronic.

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LIQUID PETROLEUM GAS (AUTOGAS) SYSTEMS AND VEHICLES WITH K-JETRONIC

VDT-I-Gen. 052 En
10.1982

Fitting at a later stage

Vehicles with K or L-Jetronic are not suitable for fitting at a later stage with liquid petroleum gas (LPG) systems.

Numerous problems can occur, such as:

- Reduction of fuel flow through the injection valves due to deposits
- Stiffness or blocking of the K-Jetronic fuel distributor plunger (due to gumming or similar) in the course of time with "gas only operation."
- Increased danger of backfiring in the intake manifold (burbling) and thereby damage to the air-flow sensor.

Guarantee

Guarantee claims for failed Jetronic components from vehicles thus converted will not be accepted.

Conversion to liquid gas operation is made at the risk of the vehicle owner.

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UNIVERSAL TEST ADAPTER

VDT-I-Gen. 1001 En

1.1982

1. Application

The multiplicity of different fuel-injection and ignition systems at present available on the market, as well as the advances in development which can be expected in the future, demand a new testing concept. In order to maintain the outlay for test equipment, and hence the costs, at a reasonable limit we have developed the universal test adapter.

The following systems can be tested using a test-adapter universal unit together with adapter leads suited to the system in question:

1.1 Systems which are already being fitted as series:

- 0 L-Jetronic (1st generation)
- 0 LE-Jetronic (2nd-generation L-Jetronic)
- 0 Motronic (with the new connector designation, refer to the vehicle-specific instructions!)

1.2 Systems whose introduction is planned:

- 0 Motronic with gearbox control
- 0 KE-Jetronic
- 0 Mono-Jetronic
- 0 Electronic ignition system with ignition map (EZF)

2. Delivery dates and Part Numbers

Available as from 2.1982.

2.1 Universal test adapter (basic unit)

Part Number: 0 684 101 801

Designation: ETT 018.01

2.2 System adapter lead for LE-Jetronic (2nd-generation L-Jetronic)

Part Number 1 684 463 123

First application: For BMW 2.5/2.8 l engines as from 9.1981, and for Opel 2.0 l engines (Manta/Rekord) as from 9.1981.

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2.3 System adapter lead for Motronic with new connector assignment.

(Refer to the vehicle-related instructions!)

Part Number : L 684 463 124

First application: Porsche 944 as from series production, BMW as from about 3.1982 (Europe)

2.4 System adapter lead for L-Jetronic (in preparation)

Further system adapter leads will be made available along with the introduction of the new systems as mentioned above.

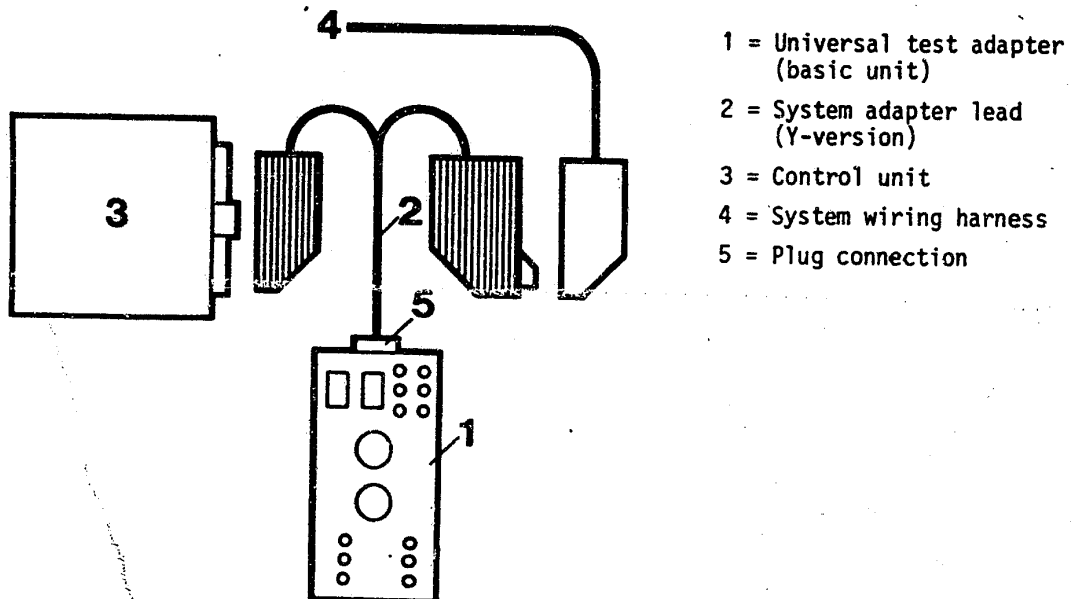
3. Testing procedure

The systems and the components are tested for voltage and resistance values as well as for correct functioning. Evaluation is by means of a multimeter and the Motortester which are connected into the universal test adapter.

Depending upon the complexity of the system, interchangeable adapter lead model 1 or model 2 is provided:

3.1 Adapter lead for peripheral and function testing (Model 1)

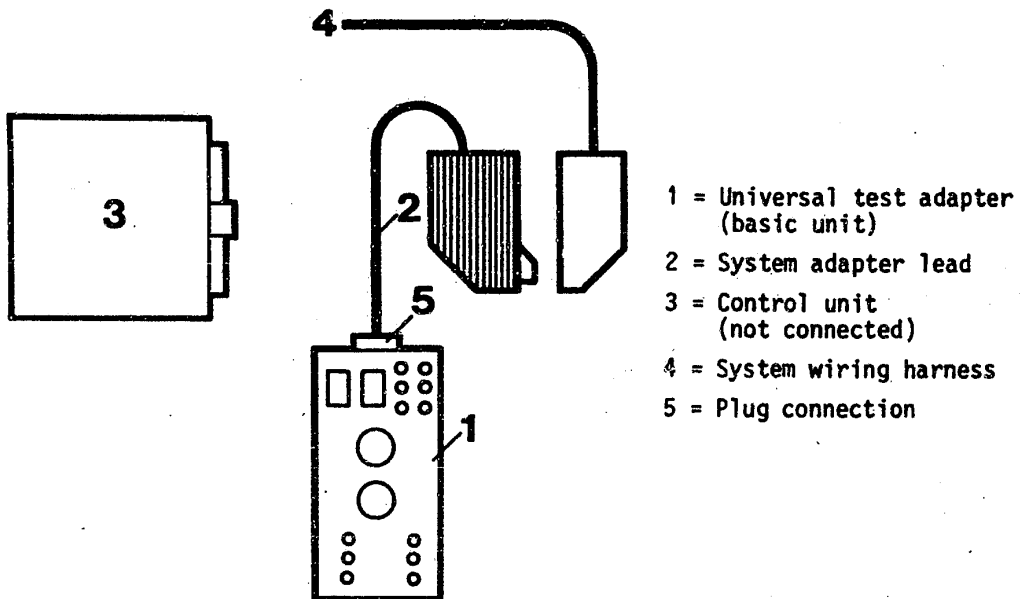
The universal test adapter together with the system adapter lead is to be connected to the system wiring harness and to the control unit (e.g. Motronic).
To be tested: Wiring harness with components and control unit.



3.2 Adapter lead for peripheral testing (Model 2)

The universal test adapter with system adapter lead, is only to be connected to the system wiring harness (e.g. LE-Jetronic (2nd-generation L-Jetronic)).

To be tested: Wiring harness with components (without control unit).

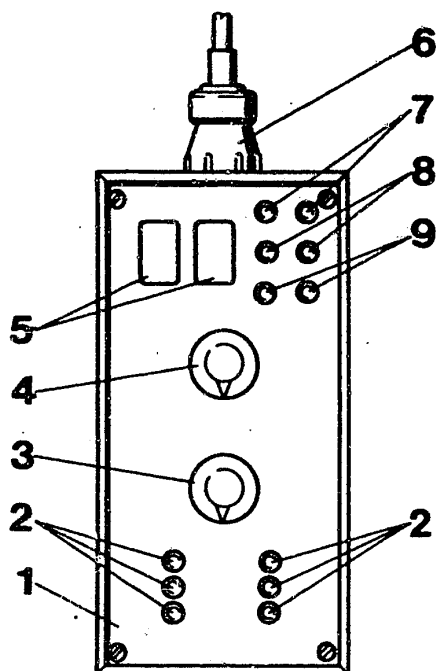


4. Construction of the universal test adapters

The universal test adapter is fitted with 2 program switches footage and resistance measurement. The measured values are displayed on the multimeter connected to the universal test adapter. For reasons of safety, the voltage and resistance sockets are separated. In order to measure signals (e.g. injection pulses, ignition pulses), it is necessary to connect a Motortester to the measuring cavities (special input).

When carrying out functional tests with the control unit connected, selected push-buttons are pressed in a number of test-program steps in order to simulate a variety of different engine operating conditions the influence of which is evaluated using the Motortester.





- 1 = Universal test adapter (basic unit)
- 2 = Keyboard for simulation of various conditions e.g. engine temperature, throttle position etc.
- 3 = Program switch "Ohm" for resistance measurement
- 4 = Program switch "Volt" for voltage measurement
- 5 = Measurement "cavities" (for the special input from the Motortester)
- 6 = 63-pole plug-in connection for connecting the system adapter lead
- 7 = Measurement sockets (voltage measurement with a multimeter or with the Motortester)
- 8 = Measurement sockets (resistance measurement with the multimeter)
- 9 = Sockets for special functions (not yet allocated)

Notes:

1. The Motronic test adapter (0 684 101 800, ETT 018.00) will continue to be used for Motronic-equipped BMW vehicles (with old connector assignment) up to about year of manufacture 3.1982 (refer to vehicle-specific instructions).
2. Details on the operation of the universal test adapter, and the test specs, are to be found in the vehicle-specific after-sales service instructions.

3. Caution! Change of Part Number:

On the SIS-microfiches OPE-00/J22 (Coordinates A14 and A17) the new Part Numbers are as follows:

Universal test adapter: 0 684 101 801

Adapter lead : 1 684 463 123



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When direct trouble-shooting a specific L-Jetronic component it is absolutely essential to look up the respective test step under the customer complaint.

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